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SURGICAL ESSAYS.

BY

ASTLEY COOPER, F.R.S.

SURGEON TO GUY'S HOSPITAL;

AND

BENJAMIN TRAVERS, F.R.S.

SURGEON TO ST. THOMAS'S HOSPITAL.

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TO

ABEL CHAPMAN, Esq.

TREASURER OF SAINT THOMAS'S HOSPITAL,

AND

BENJAMIN HARRISON, Esq.

TREASURER OF GUY'S HOSPITAL.

GENTLEMEN,

THE Public and the Profession need not to be informed of the benefits flowing to the Community from the noble institutions over which you preside.

But those only are fully competent to appreciate your merits, who are so connected with the Hospitals as to have witnessed your constant solicitude, that order, neatness and

comfort should every where prevail, and that all the provisions which humanity can suggest, should be made for the accommodation of those whom sickness or accident may consign to your protection. But your benevolence aspires to a wider range: the good which you are appointed to administer, has not been circumscribed within the Walls of your Hospital: for under your auspices, Theatres have been erected, Museums have been founded, and Lectures have been established, which comprehend the whole circle of Medical Science.

That you may long continue to watch over these excellent Institutions, which you have governed with so much judgment and humanity, is the sincere and ardent wish of,

GENTLEMEN,

Your Friends and obedient Servants,

ASTLEY COOPER.

BENJAMIN TRAVERS.

London, Jan. 1, 1818.

PREFACE.

PREFACE.

THE publication of a Work, upon the plan of that which is now submitted to the Public, has been for many years the intention of the Authors, and was only postponed until the junior should have succeeded to the situation of Surgeon to St. Thomas's or Guy's Hospital.

It would be impossible for any person to witness the abundant opportunities afforded by these munificent establishments, (which together accommodate more than eight hundred patients, besides numerous out-patients,) without participating in the anxious wish of the Authors, that they should be adequately improved.

The variety which of necessity occurs in the practice of the Surgeons—the facility afforded to them in their respective plans of treatment—the opportunities of improving the practice of

Medical Surgery—of observing the results, general and comparative, of Operations of every description—and especially of prosecuting inquiries into Morbid Anatomy, by prompt examination of the dead body, and of parts removed by operation—are advantages which while they afford ample compensation for the labours of clinical research, would allow no pretext for indifference in those, who, conscious of their value, were not influenced by an ardent desire to improve and impart them.

It is from such impressions that the present undertaking has originated. Numerous as is the class of students attending the Hospitals of the metropolis, and zealously as they are in general disposed to acquire knowledge in their profession, it falls to the lot of few to reside long at these schools of practice; and it is therefore especially desirable, that their attention during that period should be directed to the objects which are to them of greatest importance, and their judgments assisted in forming conclusions from the facts which fall under their daily observation. It is surely not less desirable when they are settled at a distance from the seats of education, and only the sphere of private practice, limited even in its greatest

extent, remains open to them ; that the suspension of professional intercourse should not chill and subdue the natural ardour of their minds ; that they should be enabled to keep pace with the never-ceasing progress of observation, and not forfeit their interest in the pursuit of the noblest of all practical sciences.

It is from no presumptuous feeling that the Authors of this Work entertain a hope, that the publication of Practical Essays, conveying the best opinions they are able to form, may, in time, produce a beneficial influence upon the practice of their art, by exposing popular errors, and deciding some of the many points still involved in doubt and obscurity.

Neither the transactions of societies, nor the periodical journals, can be expected to afford space for the details of Hospital practice : seldom the narration of occurrences in one branch of the profession is interesting to more than one class of readers, and especially, such a narration as includes more of the common than the rare ; for it is neither in the contemplation nor desire of the Editors to promulgate marvellous cases. The singularity of a case may be a good reason for its publication,

but its importance is a better; and, in general, the greater its singularity, the less its importance*. They are, therefore, disposed to think that occurrences, which by reason of their frequency attract less notice than they deserve, may yet be found to contain important matter for consideration.

How much additional value the relation of an ordinary case acquires when supported and illustrated by others nearly resembling it, is too obvious to require exemplification. It is only in the assemblage and multiplication of facts that their proper bearing can be seen, and their real value ascertained; or that they can be admitted to form a safe groundwork for the superstructure of theory.

In the present undertaking, it is perhaps needless to say, that no attempt will be made improperly to bias the public judgment. The cases of failure will be as fully detailed as those of which the issue is fortunate—the errors will be as faithfully exposed as the merits of practice, and the progress of truth shall not be retarded by the disingenuous concealment of er-

* The case of Ligature of the Aorta is an obvious exception to this remark.

ror. In pursuit of this main object, it is the determination of the Writers to avoid all invitation to controversial discussion; and while they endeavour "*studiis et rebus honestis*" to deserve the goodwill of their professional brethren, they will rather submit to be the subjects than the authors of critical animadversion.

For the literary composition of the Work, its nature and their avocations will, they trust, render apology unnecessary—the value of the matter will be their more particular concern. The delineation of morbid parts will be given in the form of slight engraving, in the hope of rendering the Work less expensive and more extensively useful.

The motive which has induced the Authors to execute this Work conjointly, is, the opportunity which it furnished of giving to the public the more extended experience, derived from the practice of the two Hospitals; and they hope soon to be enabled to publish a second Part, but the period of publication must for the present be left undetermined.

POSTSCRIPT

TO THE

SECOND EDITION.

THE Authors think it right to state, that they have availed themselves of the opportunity of a SECOND EDITION to make occasional small additions to the matter of the Papers contained in this Volume, and material alterations in some of the Plates; two of which have been re-engraved.

London, 1st May, 1818.

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ON
DISLOCATIONS,

BY

MR. ASTLEY COOPER.

A DISLOCATION is a displacement of the articulatory portion of the bone, from the surface on which it was naturally received. Definition.

Of the various accidents which happen to the body, there are few which require more prompt assistance, or upon which the reputation of the surgeon is more at stake, than cases of Luxation, for if much time be lost before the attempt at reduction, there is great additional difficulty in accomplishing it, and it is often entirely impracticable. If it remains unknown, and consequently unreduced, the patient becomes a living memorial of the surgeon's ignorance or inattention.—“What is the matter with me?” said a patient who came to my house, placing himself before me, and directing my attention to his shoulder. “Why, Sir, your arm is dislocated.”—“Do you say so? Mr.— told me it was not out.” “How long has it been dislocated?”—“Many weeks,” he replied. “Oh then, you had better not have any attempt at reduction made.” He said, “Well, I will take care that Mr.— has no more bones to set, for I will expose his igno- Necessity for prompt assistance.

rance in that part of the country in which I live.”—He was a man of malevolent disposition, and did as he had promised, to the great injury of the surgeon, who was frequently reminded of his want of skill, by meeting his former patient in his rounds, and what was worse, by hearing frequently, that the following observation was made,—“Mr—— is a good apothecary, but he knows nothing of surgery.”

In a dislocation of the Os Femoris, which still remains unreduced, a consultation was held upon the nature of the injury, and after a long consideration, this report was made by one of the surgeons,—“Well, Sir, thank God, we are all agreed, that there is no dislocation.”

Knowledge
of anatomy
necessary.

A considerable share of anatomical knowledge is required to detect the nature of these accidents, as well as to suggest the best means of reduction; and it is much to be lamented, that our students neglect to inform themselves sufficiently of the structure of the joints. They often dissect the muscles of a limb with great neatness and minuteness, and then throw it away, without any examination of the ligaments, a knowledge of which, in a surgical point of view, is of infinitely greater importance; and from hence arise the errors of which they are guilty, when they embark in the practice of their profession; for the injuries of the hip, elbow, and shoulder, are scarcely to be detected, but by those who possess accurate anatomical information. Even our hospital surgeons who have neglected their anatomy, mistake these accidents, for I have known the pul-

lies applied to an hospital patient, in a case of a fracture of the neck of the thigh-bone, which had been mistaken for a dislocation, and the patient cruelly exposed through the surgeon's ignorance, to a violent and protracted extension. It is therefore proper, that the form of the ends of the bones, their mode of articulation, the ligaments by which they are connected, and the direction in which the larger muscles act, should be well understood.

The immediate effect of dislocation is to alter the form of the joint, often to produce a change in the length of the limb, and to occasion the almost entire loss of motion of the part, after the muscles have had time to contract. In the first moments of the accident, considerable motion remains ; for I have seen a man brought into Guy's Hospital, who a few minutes before had the thigh-bone dislocated into the foramen ovale, and I was surprised to find, in a case otherwise so well marked, that a great mobility of the bone still existed at the dislocated part ; but in less than three hours, it became firmly fixed in its new situation, by the contraction of the muscles. Symptoms.

Blood is often effused in considerable quantity around the joint, and prevents an easy detection of the accident, the swelling being sometimes so considerable as to conceal entirely the ends of the bones.

A severe but obtuse pain arises from the pressure of the head of the bone upon the muscles, and sometimes the pain is more acute from its pressure upon a large nerve. From this cause

a paralysis is produced of the parts below: as is sometimes seen in dislocations of the shoulder. At other times the bone presses upon important parts so as to produce effects dangerous to life. I have for many years mentioned in my Lectures a case, of which Mr. Davie of Bungay was so kind as to send me an account, of a dislocated clavicle, which pressed upon the œsophagus so as to endanger life, and of which I shall give a more detailed history hereafter.

The head of the bone can generally be felt in its new situation, excepting in some of the dislocations of the hip, and its rotation becomes often the best criterion of the accident. The natural prominences of the bone near the joint, either disappear or become less conspicuous, as the trochanter at the hip-joint. Sometimes the reverse occurs; for, in dislocations of the elbow, the olecranon projects more than usual.

Crepitus.

The more remote effects of the accident are first, that there is often a sensation of crepitus produced by the effusion of adhesive matter (albumen) into the joint and bursæ, by which the synovia becomes inspissated, and crackles under motion, a circumstance which every practitioner should be aware of, as he may be induced to suspect the existence of fracture where none has occurred.

Inflammation,

The degree of inflammation produced is however generally only slight, but sometimes, after the reduction of dislocations suppuration ensues, and the patient dies. Mr. Howden, formerly one of our most intelligent apprentices at Guy's Hospital, and afterwards surgeon in the army, related

the following case. “ A man had his thigh dislocated upwards and backwards on the ilium, which was soon after reduced ; the next day, a considerable swelling was observed on the part, which continued to increase, accompanied with rigors, and in four days the patient died. On dissection, the capsular ligaments and ligamentum teres were found entirely torn away, and a considerable quantity of pus extravasated in the surrounding parts.”—See Minutes of the Physical Society, Guy’s Hospital, Nov. 12, 1791. I attended the master of a ship, who had dislocated his thigh upwards ; an extension was made to all appearance successfully, but in a few days a large abscess formed on the thigh, which destroyed the man. Generally, however, the inflammation is but slight which follows these accidents, the limb, if unreduced, forms for itself a new bed, and some degree of motion is gradually recovered, although from neglected dislocations in the lower extremity, the patient is ever after lame, and in the upper, the motion and power of the limb are very much diminished.

On examination of the bodies of those who die from dislocations which arise from violence, the head of the bone is found completely removed from its socket. The ligament is torn to a great extent transversely ; the particular ligaments of joints, as the ligamentum teres of the hip is torn through ; but the tendon of the biceps in dislocations of the os humeri remains unbroken as far as I have had an opportunity of judging by dissection, although I should be

Dissection.

sorry to be understood to say, that it is universally the case.

The tendons which cover the ligaments are also torn, as the tendon of the subscapularis muscle, in the dislocation in the axilla, and according to the extent of this laceration, is the facility with which the bone afterwards slips from its socket. Some of the muscles are very much shortened, some put upon the stretch, as the psoas and iliacus internus in dislocations of the hip downwards, a considerable laceration of muscles now and then occurs, of the pectineus and adductor brevis, in the dislocation of the thigh downwards, and lastly, a quantity of blood is extravasated in the cellular membrane.

Dissection
of old dis-
locations.

When a joint has been long dislocated, the head of the bone is found to have become embedded in the muscles; the articular cartilage remains, if it rests upon the muscles; but if it lies upon a bone, the articular cartilaginous surface becomes absorbed, and even a portion of the head of the bone is thus removed; the original socket becomes filled with a ligamentous secretion; its size is lessened, and form changed, by a deposit of ossific matter influenced by the pressure of the head of the bone in its new situation. When the head of the dislocated bone rests on a thick bed of muscles, in the cellular membrane, a new ligament is formed around it, which does not adhere to its cartilaginous surface, and which, in dislocations of the hip, contains the broken ligamentum teres. (See plate of Dislocation in the Ischiatic Notch.) But if the head be placed on the sur-

face of a bone or upon a thin muscle over it, that muscle becomes absorbed, and the bone undergoes a remarkable change; if the dislocation be not reduced, both the ball and the bone which receives it are changed in their form. The pressure of the ball, as from pressure in other cases, produces absorption of the periosteum and of the bone, and a smooth hollow surface is formed; and the ball becomes altered in its shape, to adapt it to its new surface: but whilst this absorption proceeds, upon the part on which the head of the bone rests, an ossific deposit takes place around from the periosteum, which is irritated but not absorbed. This bony matter is deposited between the periosteum and the original bone, by which a deep cup is formed to receive the head of the bone; and perhaps no cases can be adduced, which more strongly mark the powers of nature in changing the form of parts to accommodate them to new circumstances, than these effects of dislocation. (See the accompanying plates.)

But in those instances in which a thick bed of muscles intervenes between the head of the bone and that on which it rests, no change in either the recipient or dislocated bone is produced, as may be seen in dislocation of the thigh in the ischiatic notch. (See plate.)

The new cup which is thus formed, sometimes so completely surrounds the neck of the bone, as to prevent its being removed from it without fracture (see plate); and the socket

is smoothed upon its inner surface, to leave no projecting parts which can interrupt the motion of the bone in its new situation.

The muscles losing their action become contracted and greatly diminished in their size.

Disloca-
tions from
relaxation.

But although dislocations happening from violence are thus accompanied by the laceration of the ligament of the joint, yet they can occur from relaxation of the ligaments only.

A girl came to my house, who had the power of throwing her patella off the surfaces of the condyles of the os femoris. Her knees were bent considerably inwards, and when the rectus muscle acted upon the patella, it was drawn from the thigh-bone into a line with the tubercle of the tibia, and laid nearly flat upon the side of the external condyle of the femur. She came from the south of Europe, and said she had been brought up as a dancing girl from her earliest years, as we see children dancing upon elevated platforms in the streets of London; and she imputed to these continued exertions the weakness under which she laboured.

A relaxed state of ligaments is also produced by an accumulation of synovia in joints. Mr. Shillito, surgeon in the city, asked me to see the servant of a gentleman in my neighbourhood, who had a great enlargement of the knee-joint from an unnatural and abundant secretion of synovia; and when this was absorbed, the ligaments remained so much relaxed, that the efforts of the muscles in walking dislocated the patella. I ordered her into the hospital that the

students might observe this case, of which the following is the account.

CASE.

Ann Parish was admitted into Guy's Hospital in the autumn of 1810, for a dislocation of the left patella from relaxation of the ligaments. She had for four years previously a large accumulation of synovia in that knee, suffering some pain and much inconvenience in walking. Blisters had been applied without much effect, and other means tried about four months before her admission. When the knee had acquired considerable size, the swelling spontaneously subsided, and she then first discovered that the patella became dislocated when she extended the limb. She suffered some pain whenever this happened, and she lost the power of the limb in walking so as to fall when the patella slipped from its place, which it did whenever she attempted to walk without a bandage. The patella was placed upon the external condyle of the os femoris, when thrown from its natural situation, and did not return to it without considerable pressure of the hand. In other respects her health was good. Straps of adhesive plaster were ordered to be applied, and a roller to be worn, which succeeded in preventing the dislocation so long as they were used, but the bone again slipped from its place when they were removed. A knee cap made to lace over the joint was ordered for her.

If muscles are kept extended for a length of Paralysis.

time, and their tone becomes destroyed, or if from a paralytic affection, they lose their action, a bone may be dislocated easily, and as easily replaced.

CASE.

Mr. —, a gentleman now residing in the city, whilst in the East Indies, as a junior officer on board his ship, was placed under the orders of one of the mates when the captain was on shore—for some trifling offence this young gentleman was punished in the following manner: His foot was placed upon a small projection on the deck, and his arm was lashed tightly towards the yard of the ship, and thus kept extended for an hour. When he returned to England, he had the power of readily throwing that arm from its socket, merely by raising it towards his head; but a very slight extension reduced it: the muscles were wasted also, as in a case of paralysis. A prosecution was commenced for this act of tyranny, and I was subpoenaed to give evidence; but this petty tyrant chose to pay the forfeit for his misconduct prior to the commencement of the trial.

I was desired also to see a young gentleman who had one of those paralytic affections in his right side, which so frequently arises during dentition. The muscles of the shoulder were wasted, and he had the power of throwing his os humeri over the posterior edge of the glenoid cavity of the scapula, from whence it became easily re-

duced. In these cases no laceration of the ligaments can have occurred, and they shew the influence of the muscles in preventing dislocation from violence, and in impeding its reduction.

Dislocations frequently occur from ulceration, by which the ligaments are detached, and the bones become destroyed. We frequently see this state of parts in the hip-joint, the ligaments ulcerated, the edge of the acetabulum absorbed, and the head of the thigh-bone altered, both in its magnitude and figure, escaping from the acetabulum upon the ilium, and there forming for itself a new socket. We have in the Anatomical Collection at St. Thomas's Hospital a preparation of the knee dislocated by ulceration, ankylosed at right angles with the femur, and turned directly forwards.

Dislocation
from ulceration.

Dislocations are often accompanied with fracture. At the ankle-joint it rarely happens that dislocation occurs without a fracture of the fibula, and at the hip-joint the acetabulum is every now and then broken, of which an example will be seen in the following

Fracture
and dislocation.

CASE.

Thomas Steers was admitted into Guy's Hospital on the 28th of October, 1805, with a dislocation of the os femoris into the ischiatic notch. The dislocation was reduced by a very slight extension compared with that which is commonly required. This was imputed to his having vomited at the time of his admission, and to the depression of strength which a state of

nausea is known to produce. But he soon complained of severe pain extending over his abdomen, and he died the day following his admission. Upon inspecting his body, the jejunum was found ruptured; and upon examination of the hip-joint, a portion of the edge of the acetabulum was broken off.

Dislocations of the os humeri are also sometimes accompanied with fracture of the head of that bone, of which we have a specimen in the Museum at Saint Thomas's Hospital. The coronoid process is sometimes broken in dislocations of the ulna, producing a species of luxation, which does not admit of the bone being afterwards preserved in its natural situation. What have been called dislocations of the spine are really fractures of the vertebræ, and not true dislocations, if we except the first and second vertebræ of the neck.

Simple or
compound.

Dislocations are either simple or compound; the simple dislocation is rarely dangerous, and those are considered as simple in which the skin remains unbroken, although the accident may be otherwise complicated; but these luxations, without wounds, may sometimes become compound, unless great care be taken to prevent the pressure of the bone, occasioning inflammation and ulceration.

Compound.

Compound dislocations are attended with great danger, and on the following account.

When a joint is opened, inflammation of the lacerated ligaments and synovial membrane speedily succeeds, in a few hours suppuration

begins, and granulations arise from the surface of the synovial membrane. But the same process does not immediately take place upon the extremities of the bone, because it is covered by the articular cartilage. This cartilage, before the cavity fills with granulations, becomes absorbed, by an ulcerative process instituted on the end of the bones. Numerous abscesses are generally formed, in different parts of the joint, and at length granulations spring from the extremities of the bone deprived of their cartilages, and fill up the cavity; generally these granulations become ossified, and ankylosis succeeds; but sometimes they remain of a softer texture, and some degree of motion in the joint is gradually regained.

This process of filling up joints, requires great general, as well as local efforts; high constitutional irritation is produced, and if the constitution be weak, the patient, to preserve his life, is sometimes obliged to submit to the operation of amputation.

Some joints dislocate easily, and frequently; others very rarely. Those which have naturally extensive motions are easily dislocated, and hence the luxation of the os humeri occurs much more frequently than any other, and when it has been once dislocated, it happens again easily in the natural upward motion of the joint. It is wisely ordained that when a part has extensive motion, and great strength is required, it is effected by making numerous joints instead of one. Thus, in the spine in which great strength is necessary to protect the spinal mar-

Some joints
dislocated
easily.

row, numerous joints are formed, and the motion between any two bones is so small, that dislocations, except between the 1st and 2d vertebræ, hardly ever occur, although the bones are often displaced by fracture.

The carpus and the tarsus are constituted in the same manner, they allow of considerable motion, yet maintain great strength of union. For if the motion between two bones as in the spine, be multiplied by 24, and then at the carpus by 7, it will be seen that great latitude of motion is given, and the strength of the part preserved, whilst, if the spine had been formed of a single joint, dislocations might have easily happened, and death from this cause must have been a very frequent occurrence.

Partial.

Bones are not always thrown entirely from the articulatory surface, on which they rested, so that dislocations may be partial only. This circumstance sometimes occurs at the ankle-joint.

An ankle was dissected at Guy's, and given to the Collection of Saint Thomas's, which was partially dislocated; the end of the tibia rested still in part upon the astragalus, but a larger portion of its surface was seated on the os naviculare, and the tibia altered by this change of place had formed two new articulatory surfaces, with their faces turned in opposite directions towards the two bones. The dislocation had not been reduced. The knee is I believe rarely dislocated in any other way. The os humeri sometimes rests upon the edge of the glenoid cavity, and readily returns into

its socket, and the elbow-joint is dislocated partially, both as regards the ulna and the radius.

The lower jaw is sometimes partially dislocated in a different manner ; one of the joints being luxated, and the other remaining in its place.

Dislocations are generally occasioned by violence, and the force is applied, whilst the bone dislocated is forming an angle with its socket ; but it is necessary that the muscles should be in a great degree unprepared for resistance, or the greatest force will hardly produce dislocations, but when they are unprepared, very slight accidents will often produce the effect. A fall in walking will sometimes dislocate the hip-joint, when the muscles have been prepared for a different exertion. Cause.

While dwelling on this subject in my Lectures, I have usually quoted the execution of Damien, as illustrative of this opinion.

“ Damien was executed for the attempt to murder Lewis the XVth. Four young horses were fixed to his legs and arms, and were forced to make repeated efforts to tear his limbs from his body, but could not effect this intention ; and after fifty minutes the executioners were obliged to cut the muscles and ligaments to effect his dismemberment.”

The following is the French account of this execution :

“ Il arriva a la place de Grève a trois heures et un quart, regardant d'un œil sec et ferme le lieu, et les instrumens de son supplice. On lui brula d'abord la main droite ; ensuite on le

tenailla, et on versa sur ses plaies de l'huile, du plomb fondu, et de la poix-resine. On procéda ensuite a l'ecartellement. Les quatre chevaux firent pendant cinquante minutes des efforts inutiles pour demembrer ce monstre. Au bout de ce tems la, Damien etant encore plein de la vie, les bourreaux lui couperent avec des bistouris, les chairs et les jointures nerveuses des cuisses, et des bras; ce qu'on avoit été obligé de faire en 1610 pour Ravallac. Il respiroit encore après que les cuisses furent coupées, et il ne rendit l'ame que pendant qu'on lui coupoit les bras. Son supplice depuis l'instant qu'il fut mis sur l'echafaud, jusqu' au moment de sa mort, dura près d'une heure et demie. Il conserva toute sa connoissance, et releva sa tête sept ou huit fois, pour regarder les chevaux, et ses membres tenaillés et brulés. Au milieu des tourmens les plus affreux de la question il avoit laissé echapper des plaisanteries."—Dictionnaire Historique.

Dislocations rare in the young.

Young persons are very rarely the subjects of dislocations. Their bones break, or their epiphyses give way rather than the parts displace. I read of dislocations of the hip in children, but their history is that of diseases of the hip-joint, and the dislocation arises from ulceration. A child was brought to me from one of the counties north of London, who had repeated extensions made by one of those people called *bone setters* (but who ought rather to be called *dislocators*), for a supposed dislocation of the hip-joint. Upon examination, I found the case that disease of the hip, which is so common

in children, and for this only, was a child wantonly exposed to a most painful extension. That in this enlightened country, men without education should be with impunity suffered to degrade a most useful profession, and put to the torture those who have the folly to apply to them, is a disgrace to our laws, and calls loudly for prevention.

Dislocations of the elbow-joint in children are said to be of frequent occurrence.—Surgeons say, “I have a child under my care with luxation of its elbow, and I can easily return the bone into its place, but it directly dislocates again.” Such a case is an oblique fracture of the condyles of the os humeri, which produces the appearance of dislocation, by allowing the radius and ulna, or the ulna alone, to be drawn back with the fractured condyle, so as to produce a considerable projection at the posterior part of the joint.

The impediments to the reduction of dislocation are often imputed to causes which do not exist. In some joints the form of the bone gives rise to difficulty, but in a much less degree than is generally supposed. When the socket is surrounded by a lip of bone, as in the hip-joint, the head of the bone in its reduction stops at this projection, and it requires to be lifted over it : and when the head of a bone is much larger than its cervix, a difficulty arises from this cause, as for example, in the dislocation of

Reduction.

Difficulty
in bone.

the head of the radius, but still these causes are slight, in comparison with others which we have to detail.

The ligaments.

The capsular ligaments are supposed to resist reduction. But those who are of that opinion, must forget their inelastic structure, and cannot have had opportunities of witnessing by dissection the extensive laceration which they sustain in dislocations from violence; the idea of the neck of the bone being girt or confined by the ligament is quite untrue. The capsular ligaments in truth possess but little strength either to prevent dislocation, or to resist the means of reduction: if the tendons with which they are covered, and the peculiar ligaments of the joints did not exist, dislocation must be of very frequent occurrence.

Tendons.

The joint of the shoulder, and that of the knee and elbow, are strongly protected by tendons; the shoulder, by the tendons of the spinati, subscapularis and teres minor muscles; the elbow by the triceps and brachialis; the knee by the tendinous expansion of the vasti; but still it is an error to suppose that some ligaments do not powerfully resist dislocations; but these are the peculiar—not the capsular ligaments.

Peculiar ligaments.

The wrist and the elbow have their peculiar ligaments, to give strength to the structure of these joints. The shoulder, instead of a peculiar ligament, has the tendon of the biceps received into it to render dislocation forwards more difficult; the hip-joint possesses its ligamentum teres, to prevent a ready dislocation downwards; the knee has its lateral and crucial ligaments;

and the ankle is provided with ligaments of the same kind, and of very extraordinary strength, to prevent a dislocation, exposed as it is to the most severe injuries—the bones of this joint often rather break than their ligaments give way—however, in many of the joints, as these ligaments are torn, they afford no resistance to the reduction of dislocation, as in the hip, elbow, and wrist; but if one of them remains, it produces some difficulty in the reduction, as I have seen in the knee-joint.

The difficulty in reducing dislocation principally arises from the resistance which the muscles give by their contraction, and which is proportioned to the length of time which has elapsed from the injury; therefore it is desirable that the attempt at reduction should not be long delayed. Muscles.

The common actions of the muscles are voluntary or involuntary, but they have a power of contraction independent of either state.

A muscle soon fatigues when excited to action by volition, and it requires rest. The arm can only be extended for a few minutes at right angles with the body, before it feels a fatigue, which requires suspension of action. The heart also has its contraction and relaxation.

But when a muscle is divided, its parts contract, or when the antagonist muscle is cut, the undivided muscle draws the parts into which it is inserted into a fixed situation. Thus, if the biceps muscle be divided, the

triceps keeps the arm constantly extended ; if the muscles on one side of the face are paralytic, the opposing muscles draw the face to their side. This contraction is not succeeded by fatigue or relaxation, but will continue an indefinite time, even until the structure of the muscle becomes changed ; and its contraction increases daily in its power of resistance from the first occurrence of the accident. Thus it is that when a bone is dislocated, the muscles draw it as far from the joint as the surrounding parts will allow, and there by their contraction they fix it. It is this resistance from muscles, aided by their voluntary contraction, which it is the business of the surgeon to counteract. If an extension be made almost immediately after a dislocation has happened, the resistance produced by the muscles is easily overcome ; but if the operation is protracted for a few days only, the utmost difficulty occurs in effecting it.

That the muscles are the chief cause of resistance is strongly evinced, by those cases in which the dislocation is accompanied by injury to any vital organ ; for it is then found, that a very slight force is sufficient to return the bone to its situation. Thus in the man who had an injury to his jejunum and a dislocation of the hip, in the case already mentioned, the bone was restored to its place most easily.

With respect to the means to be employed, for reducing dislocations, it is now generally agreed amongst the most eminent surgeons,

that force should be only gradually applied. Violence is as likely to tear sound parts as to reduce those which are luxated; it calls up all the powers of resistance to oppose the efforts making by the surgeon. But it is his duty to produce gradually that state of fatigue and relaxation which is sure to follow continued extension, and not to attempt at once to overpower the action of the muscles.

Force gradual.

When a dislocation has long happened, difficulties arise from three other circumstances: the extremity of the bone contracts adhesion to the surrounding parts, so that even when in dissection the muscles are removed, the bone can not be reduced. In this state I found the head of a radius, which had been long dislocated upon the external condyle of the os humeri, and which is preserved in the Collection at Saint Thomas's Hospital, and in a similar state I have seen the os humeri when dislocated. The socket is also sometimes filled with adhesive matter, that if the bone was reduced it could not remain in its original situation. Lastly, a new bony socket is sometimes formed in which the head of the bone is so completely confined, that nothing but its fracture could allow it to escape from its new situation. (See Plate 2.)

Other difficulties.

The means employed for the reduction of dislocations are either constitutional or mechanical; it is generally wrong to employ force only, as it becomes necessary to use it in such a degree as to occasion violence and injury, and it will in the sequel be shewn that the most powerful mechanical means fail when unaided

Means of reduction.

Constitutional.

by constitutional. The power of the muscles in the first instance, is to be duly appreciated, which forms the principal cause of resistance. The means to be employed for the purpose are, to produce a tendency to syncope and sometimes fainting itself by the abstraction of a quantity of blood, and by placing the patient in a warm bath to occasion a similar feeling. If the blood be removed quickly, by a large orifice, it is known that fainting is more readily produced, and a hot-bath from 100° to 110° will often not produce syncope, unless blood has been previously drawn.

Nausea.

But of late years I have practised another mode of lowering the action of the muscles, by exhibiting nauseating doses of tartarized antimony. This given in repeated doses, produces sickness but not vomiting; emetics have been recommended, and there is no doubt but the state of nausea which they produce is useful; but the vomiting is in itself of no use, for as soon as the nauseating effect is produced, the muscles lose their tone, and dislocations can be reduced, with comparatively less effort, and at a more distant time from the accident, than can be effected in any other way. Two cases are related in the following pages. One from Mr. Norwood, surgeon, Hertford, the other from Mr. Thomas, apothecary to Saint Luke's Hospital, in which, by the combination of bleeding, warm-bath, and nauseating doses of tartarized antimony, dislocations were reduced at a period from the accident, greater than I have ever known in any other example. One of these

cases occurred at Guy's and the other at Saint Thomas's Hospital, at the time these gentlemen were officiating as dressers. (See cases of dislocation on the ilium.)

The effect of opium I have never tried, but Opium. it would probably be useful from its power of diminishing the nervous influence.

The reduction of the bone is to be attempted after lessening the powers of the muscles, by making an extension of the limb, by fixing one bone, and drawing the other towards its socket. Mechanical means. One great cause of failure, in the attempt to reduce dislocations, arises from insufficient attention to fixing that bone in which the socket is placed. As for example, in attempting to reduce a dislocation of the shoulder, if the scapula be not fixed, or one person pulls at the scapula and two at the arm, the scapula is necessarily drawn with the os humeri, and the extension is very imperfectly made; the one bone therefore must be as firmly fixed as the other is extended.

The force may be applied either by the Compound pulley. exertion of assistants or by a compound pulley; but the object is to extend the muscles by gradual, regular, and continued force; the pulley in cases of difficulty should always be resorted to; its force may be directed by the surgeon's mind; but when assistants are employed, their exertions are sudden, violent, and often ill-directed, and the force is more likely to produce laceration of parts, than to restore the bone to its situation. Their efforts are also frequently uncombined, and their mus-

cles necessarily fatigue, as well as those of the patient whose resistance they are employed to overcome.

In dislocation of the hip-joint, pullies should always be employed; and in those dislocations of the shoulder which have remained long unreduced, they should also be resorted to. I do not mean to doubt of the possibility of reducing dislocation of the hip by the aid of men, but to point out the inferiority of this mode to the pullies. Most writers on surgery have hinted at the use of pullies, but they have not duly appreciated them: my good master, Mr. Cline, whose professional judgment no man can deny, always strongly recommended them.

During the attempt to reduce luxations, the surgeon should endeavour to obtain a relaxation of the stronger muscles. The limb should therefore be kept in a position between flexion and extension, as far as it can be obtained. Who has not seen in the attempt to reduce a compound fracture in the extended position of a limb, the bone, which could not be brought in apposition under the most violent efforts, quickly replaced by an intelligent surgeon, who immediately directed the limb to be bent, and the muscles to be placed in a comparative state of relaxation?

A difference of opinion prevails, whether it is best to apply the extension on the dislocated bone or on the limb below. M. Boyer, who has long taken the lead in surgery in Paris, prefers the latter mode. As far as I have had an opportunity of observing, it is generally best to apply

the extension to the bone which is dislocated. There are exceptions to this however, in the dislocation of the shoulder, which I generally reduce by placing the heel in the axilla, and by drawing the arm at the wrist in a line with the side of the body, as when the arm is placed close to the side, the pectoral muscle and the latissimus dorsi are brought into a state of relaxation; and they form a powerful opposition when the arm is carried far from the side.

Great advantage is derived in the reduction of dislocations from attending to the patient's mind; the muscles opposing the efforts of the surgeon, by acting in obedience to the will, may have that action suspended by directing the mind to other muscles. Several years ago, a surgeon in Blackfriars Road, asked me to see a patient of his with a dislocated shoulder, which had resisted the various attempts he had made at reduction. I found the patient in bed with his right arm dislocated; I sat down on the bed by his side, placed my heel in the axilla, and drew the arm at the wrist; the dislocated bone remained unmoved. I said, Rise from your bed, Sir; he made an effort to do so, whilst I continued my extension, and the bone snapped into its socket; for a similar reason, a slight effort, when the muscles are unprepared, will succeed in reduction of dislocation, after violent measures have failed.

Influence of
the mind.

When a bone has been reduced by the pullies, it will not remain in its situation without the aid of bandages, which are required to support it till muscular action returns. The hip,

Second
dislocation.

however, is rarely dislocated a second time, but the shoulder and the lower jaw very frequently slip again from their sockets, owing to the little depth of the socket in these joints, and therefore they require bandages for some time subsequent to reduction.

On the Dislocations of the Hip-Joint.

The acetabulum of the hip-joint is deepened by a cartilaginous edge, which surrounds its brim, and it is made a complete cup in the recent subject by another cartilage which fills up a depression in the bone, in the inferior and anterior part of the cavity.

The ligaments are two: the capsular arises from the edge of the acetabulum, and passing over the head and neck of the bone is inserted into the cervix at the root of the trochanter major; it is thick at its fore part, and thin posteriorly. Strong portions of ligament are extended over it, from the ilium near its anterior and inferior spinous process. The ligamentum teres, which is contained within the capsular ligament, proceeds from a depression in the lower and inner part of the acetabulum to be fixed in a hollow upon the inner side of the head of the thigh-bone.

The synovial membrane lines the capsular ligament, and is reflected upon the neck of the thigh-bone, and on the ligamentum teres. The round ligament has a tendency to prevent dislocations in all directions, but particularly the dislocation downwards.

The thigh-bone I have seen dislocated in

four directions only. First, upwards or upon the dorsum of the ilium. Secondly, downwards, or into the foramen ovale. Thirdly, backwards, and upwards, or into the ischiatic notch: and, Fourthly, forwards and upwards, or upon the body of the pubis. No dislocation downwards and backwards has occurred at St. Thomas's or Guy's Hospital within the last thirty years, or in my private practice; and I doubt its existence, although I would not deny the possibility of its occurrence, being disposed to believe some mistake has arisen upon this subject.

Of the Dislocation upwards, or on the Dorsum Ilii.

This dislocation is the most frequent of those which happen to the hip-joint, and the following are the signs by which its existence is known.

The limb on the dislocated side is from one Symptoms. inch and half to two inches and half shorter than the other, as is well seen by comparing the malleoli interni, and by bending the foot at right angles with the leg. On the dislocated side the toe rests against the tarsus of the other foot. The knee and foot are turned inwards, and the knee is a little advanced upon the other. When the leg is attempted to be separated from the other it cannot be accomplished for the limb is firmly fixed in its new situation, so far as regards its motion outwards; but the thigh can be slightly bent across the other. If so much blood has not been effused, as to conceal the bones, the

head of the thigh-bone can be perceived during rotation of the knee inwards, moving upon the dorsum of the ilium, and the trochanter major advances towards the spinous process of the ilium, so as to be felt much nearer to it than usual. The trochanter is less prominent than that on the opposite side, for the neck of the bone and the trochanter are resting in the line of the surface of the dorsum ilii: upon a comparison of the two hips, the roundness of the dislocated side has disappeared. A surgeon then, called to a severe and recent injury of the hip-joint, looks for a difference in length, change of position inwards, diminution of motion, and decreased projection of the trochanter. The accident with which the dislocation upwards is liable to be confounded, is the fracture of the neck of the thigh-bone, within the capsular ligament. Yet the marks of distinction are generally sufficiently strong to prevent an error in a person commonly attentive. In a fracture of the neck of the thigh-bone, the knee and foot are generally turned outwards: the trochanter is drawn backwards: the limb can be readily bent towards the abdomen, although with some pain: but above all, the limb which is shortened from one to two inches, by the contraction of the muscles, can be made of the length of the other by a slight extension, and when the extension is abandoned, the leg is again shortened. If when extended the limb is rotated, a crepitus can often be felt, which ceases when rotation is performed under a shortened state of the

limb. The fractured neck of the thigh-bone within the capsular ligament, rarely occurs but in advanced age, and it is the effect of the most trifling accidents, owing to the absorption which this part of the bone undergoes at advanced periods of life. Fractures externally to the capsular ligament occur at any age, but generally in the middle periods of life; and these are easily distinguished by the crepitus which attends them, if the limb be rotated, and the trochanter compressed with the hand. The position is the same as in fractures within the ligament. The proportion of fractures of the neck of the thigh-bone, which I have seen, is at least four cases to one of dislocation. (See the plate for the positions of the limb in dislocations.)

Diseases of the hip-joint can scarcely be confounded with dislocations from violence, but by those who are not anatomists, and are incapable of observation. The gradual growth of the symptoms, the pain in the knee, the apparent elongation at first, and real shortening afterwards, the capacity for motion, yet the pain given under extremes of rotation, as well as of flexion and extension, are marks of difference which would strike the most careless observer. In diseases of this kind, when they have existed a great length of time, ulceration of the ligaments, acetabulum, and head of the bone, allow of such a change of situation of parts, as to give to the limb the position of dislocation; but the history of the case at once informs the medical attendant of the nature of the disease.

Muscles. In the dislocation upwards, the pyriformis and the glutei muscles are all shortened, as are also the triceps and pectineus, the psoas magnus and iliacus internus, the rectus, the semitendinosus and semimembranosus, and one head of the biceps. The obturator externus is shortened, but the obturator internus, gemini and quadratus are put upon the stretch. The muscles which, more than others, resist the reduction, are the glutei and triceps.

Cause. The cause of this dislocation is, that the patient falls when the knee and foot are turned inwards, or he receives a blow whilst the limb is in that position, and the head of the bone is then dislocated upwards, and turned backwards.

Reduction. In the reduction of this dislocation the following plan is to be adopted : take from the patient from twelve to twenty ounces of blood, or even more, if he be a very strong man ; and then place him in a warm-bath at the heat of 100° , and gradually increase it to 110° , until he feels faint. During the time he is in the warm-bath, give him a grain of tartarized antimony every ten minutes until he feels some nausea, then remove him from the baths and put him in blankets, and place him between two strong posts about ten feet from each other, in which two staples are fixed ; or rings may be screwed into the floor, and the patient be placed upon it. Our usual method is to place him on a table covered with a thick blanket, upon his back ; then a strong girt is passed between his pudendum and thigh, and this is fixed to one of

the staples. (See Plate.) A wetted linen roller is to be tightly applied just above the knee, and upon this a leather strap is buckled, having two straps with rings at right angles with the circular part. The knee is to be slightly bent, but not quite to a right angle, and brought across the other thigh a little above the knee. The pulleys are fixed in the other staple, and in the strap above the knee. The patient being thus adjusted, the surgeon slightly draws the string of the pulley, and when he sees that every part of the bandage is upon the stretch, and the patient begins to complain, he waits a little to give the muscles time to fatigue; he then draws again, and when the patient complains much, again rests, until the muscles yield. Thus he gradually proceeds until he finds the head of the bone descend. When it reaches the lip of the acetabulum, he gives the pulley to an assistant, and desires him to preserve the same state of extension, and the surgeon then rotates the knee and foot gently outwards, but not doing it with a violence to excite opposition in the muscles, and in this act the bone slips into its place. In general it does not return with a snap into its socket when the pulleys are employed, because the muscles are so much relaxed, that they have not sufficient tone remaining to permit them to act with violence, and the surgeon only knows of the reduction by loosening the bandages. It often happens that the bandages get loose before the extension is completed, which should be guarded against as much as possible, by having them well secured

at first, but if they are obliged to be renewed, as little time as possible should elapse in their re-application, to prevent the muscles having time to recover their tone.

It is sometimes necessary to lift the bone by placing the arm under it near the joint when there is difficulty in bringing it over the lip of the acetabulum.

After the reduction, in consequence of the relaxed state of the muscles, great care is required in removing the patient to his bed.

The two cases which follow, shew the advantage derived from the employment of constitutional as well as mechanical means. I am indebted to Mr. Norwood, surgeon at Hertford, for the detail of the following

CASE.

William Newman, a strong muscular man, nearly 30 years of age, was admitted into Guy's Hospital, on Wednesday, December 4th, 1812, under the care of Mr. Astley Cooper, for a dislocation of the hip-joint. In springing from the shafts of a waggon, on Thursday, November 7th, his foot slipped and his hip was driven against the wheel with considerable force. He immediately fell, and being found to be unable to walk, was carried to Kingston Workhouse, which was near the place at which the accident happened. On the evening of that day, he was examined by a medical man, but the nature of the accident was not ascertained. He remained at Kingston until the 31st of Novem.

ber, and was then removed to Guildford his place of residence, and from thence was sent on the 4th of December to Guy's Hospital. On examination, the head of the thigh-bone was found resting on the dorsum ilii, the trochanter was thrown forwards towards the anterior superior spinous process of the ilium. The knee and foot were turned inwards, and the limb shortened one inch and an half; the great toe rested upon the metatarsal bone of the other foot, and there was but little motion in the limb.

On Saturday, December the 7th, being thirty days after the accident, an extension was made to reduce the limb, and previously to the application of the bandages, he was bled to twenty-four ounces from his arm; in about ten minutes after this he was put into a warm bath, where he remained until he became faint, which happened in fifteen minutes; he then had a grain of tartarized antimony given him, which was repeated in sixteen minutes, as the first dose did not produce nausea. The most distressing nausea was now quickly produced, but he did not vomit, and under the influence of this debilitating cause, he was carried into the operating theatre in a state of great exhaustion. He was placed on a table on his left side. The bandage was applied in the usual manner to fix the pelvis, and the pulleys were fastened to a strap around the knee. The thigh was drawn obliquely across the other, not quite two-thirds of its length downwards, and the extension was continued for ten minutes, when the bone slipped into its socket. The man was discharged from

the hospital in three weeks from the period of his admission, making a rapid progress towards a recovery of the perfect use and strength of the limb.

CASE II.

For these details I am indebted to Mr. Thomas, who is now apothecary to St. Luke's Hospital, but who attended this case as dresser at St. Thomas's Hospital.

William Chapman, aged 50 years, was admitted into St. Thomas's Hospital, on Thursday, September 10th, 1812, with a dislocation of the hip, upon the left dorsum ilii, which was occasioned by the mast of a ship falling upon the part, and throwing him down, on the Wednesday *six weeks* prior to his admission into the hospital. It was reduced on Friday the 11th of September, in the following manner. The patient was bled by opening a vein in each arm, and thirty-four ounces of blood were taken away. He was then put into a warm-bath, and a grain of tartarized antimony given him which was repeated every ten minutes; this, with the previous means, produced fainting and nausea.

The patient was then placed on a table on his right side, and a girt was carried between his thighs and over his pelvis, so as to completely confine it; a wetted roller was applied above the knee, and upon it a leathern belt, with rings for the pullies. The extension was then made in a direction so that the dislocated thigh crossed

the other below its middle, which in half an hour succeeded in reducing it.

Contrast this case with the following.

CASE III.

I was desired to visit a man aged 28 years, who, by the overturning of a coach, had dislocated his left hip more than five weeks before, and who had been declared not to have a dislocation, although the case was extremely well marked. His leg was full two inches shorter than the other; his knee and foot turned inwards; and the inner side of the foot rested opposite to the malleolus internus of the other leg. The thigh was slightly bent towards the abdomen, and the knee was advanced over the other thigh. The head of the thigh-bone could be distinctly felt upon the dorsum of the ilium; and when the two hips were compared, the natural roundness of the dislocated side had disappeared. I used only mechanical means in my attempts at reduction, and although I employed the pullies, and varied the direction of repeated extensions, I could not succeed in replacing the bone, and this person returned to the country with the dislocation unreduced.

In the following case, the extensions were made by men without the aid of pullies.

CASE IV.

William Piper, aged 25 years, had the wheel of a cart laden with hay pass between his legs

and over the upper part of his right thigh. Mr. Holt, surgeon at Tottenham, was sent for nearly a month after the accident had happened; he found him in great pain, attended with fever and much local inflammation and tension. He bled him largely, purged him freely, and applied leeches. The leg was shorter than the other, and the head of the bone was seated upon the dorsum ilii; the knee and foot were turned inwards. As I visited Tottenham frequently at that time, Mr. Holt asked me to see the man with him, and we agreed to the propriety of making a trial to reduce it. Mr. Holt and myself, assisted by five strong men, exerted our best endeavours to put the bone into its socket. Repeatedly fatigued, we were several times obliged to relax and renew our attempts. At length, exhausted, we were about to abandon any further trial, but agreed to make one last effort, when at fifty-two minutes after the commencement of the attempt, the bone slipped into its socket.

I also, in a case which I attended with Mr. Dyson in Fore Street, succeeded in reducing the limb without the pullies; but the violence used was so great, the extension so unequal, (and our fatigue was nearly as severe as that of the patient,) that I am confident no person who had used pullies in dislocation of the hip, would have recourse to any other mode, excepting in the dislocation into the foramen ovale.

*On the Dislocation downwards, or in the Foramen
Ovale.*

This accident happens when the thighs are widely separated from each other. The ligamentum teres and the lower part of the capsular ligament are torn through, and the head of the bone becomes situated in the posterior and inner part of the thigh upon the obturator externus muscle. The limb is in this case from two to three inches longer than the other. The head of the bone can be felt by pressure of the hand, upon the inner and upper part of the thigh towards the perineum. The trochanter major is less prominent than on the opposite side. The body is bent forwards, owing to the psoas and iliacus internus muscles being put upon the stretch. The thigh is considerably advanced if the body be erect; the knee is widely separated from the other, and cannot be brought without great difficulty near the axis of the body to touch the other knee, owing to the extension of the glutei and pyriformis muscles. The foot, though widely separated from the other, is neither turned outwards nor inwards generally, although I have seen it varying a little in this respect in different instances; but the position of the foot does not in this case mark the accident. It is the bent position of the body, the separated knees, and the increased length of the limb, which are the diagnostic symptoms.

Mode of the
accident.

Signs of.

Dissection.

We have an excellent preparation of this accident in the collection at St. Thomas's Hospital, which I dissected many years ago. The head of the thigh-bone was found resting in the foramen ovale, but the obturator externus muscle was completely absorbed, and the ligament naturally occupying the foramen, was entirely converted into bone. Around the foramen ovale bony matter was deposited, so as to form a deep cup, in which the head of the thigh-bone was inclosed, but in such a manner as to allow of considerable motion ; and the cup thus formed surrounded the neck of the thigh-bone without touching it, so as to inclose the head, that it could not be removed from its new socket without breaking its edges. The inner side of this new cup was extremely smooth, having not the least ossific projection at any part of it to impede the motion of the head of the bone, which was only restrained by the muscles from its usual movements. The original acetabulum was half filled by bone, so that it could not have received the ball of the thigh-bone if it had been put back into its natural situation. The head of the thigh-bone was very little altered ; its articular cartilage still remained ; the ligamentum teres was entirely broken, and the capsular ligament partially torn through ; the pectinalis muscle and adductor brevis had been lacerated, but were united by tendon ; the psoas muscle and iliacus internus, the glutei and pyriformis were all upon the stretch. Nothing can be more curious, or to the surgeon and physiologist more beautiful, than the changes produced by this

neglected accident in shewing the resources of nature in producing restoration.

The reduction of this dislocation is generally very easily effected. If the accident has happened recently, all that is required is to place the patient upon his back, to separate the thighs as widely as possible, and to place a girt between the pudendum and upper part of the thigh, fixing it to a staple in the wall. The surgeon then puts his hand upon the angle of the dislocated side, and draws it over the sound leg, and it slips into its socket. Thus I saw a dislocation reduced, which had happened very recently, and which was subjected to an extension in St. Thomas's Hospital almost immediately after the patient's admission. In this case the thigh might be fixed by the bed-post received between the pudendum and the upper part of the limb, and the leg be carried inwards across the other. But in general it is required to fix the pelvis by a girt passed around it, and crossed under that which passes around the thigh, otherwise the pelvis moves in the same direction with the head of the bone. (See Plate.) And in those cases in which the dislocation has existed for three or four weeks, it is best to place the patient upon his side, to fix the pelvis by one bandage, and to carry another under the thigh to which the pullies are affixed, then to draw the thigh upwards whilst the surgeon presses down the foot, to prevent the lower part of the limb being drawn with the thigh-bone. Thus the limb is used as a lever with very considerable power. Great care must be taken not to advance the leg in any considerable degree, other-

wise the head of the thigh-bone will be forced behind the acetabulum into the ischiatic notch, from whence it cannot be afterwards reduced.

Of the Dislocation backwards, or in the Ischiatic Notch.

Nature of
the acci-
dent.

In this dislocation the head of the thigh-bone is placed on the pyriformis muscle, between the edge of the bone which forms the upper part of the ischiatic notch, and the sacro-sciatic ligaments, behind the acetabulum, and a little above the level of the middle of that cavity.

Detection
difficult.

It is the dislocation most difficult both to detect and to reduce :—to detect, because the length of the limb differs but little, and its position is not so much changed as regards the knee and foot, as in the dislocation upwards : to reduce, because the head of the bone is placed deep behind the acetabulum, and it therefore requires to be lifted over its edge, as well as to be drawn towards its socket.

Signs.

The signs of this dislocation are, that the limb is about half an inch to one inch shorter than the other, but generally not more than half an inch ; that the trochanter major is behind its usual place, but is still remaining nearly at right angles with the ilium, with a slight inclination towards the acetabulum. The head of the bone is so buried in the ischiatic notch, that it cannot be distinctly felt except in thin persons, and then only by rolling the thigh-bone forwards as far as the comparatively fixed state of the limb will allow. The knee and the foot

are turned inwards, but not nearly so much as in the dislocation upwards, and the toe rests against the ball of the great toe of the other foot. When the patient is standing, the toe touches the ground; but the heel does not quite reach it. The knee is not so much advanced as in the dislocation upwards, but is still brought a little more forward than the other, and is slightly bent. The limb is fixed, so that both flexion and rotation are in a great degree prevented. Signs.

We have a good specimen in the collection at St. Thomas's Hospital, which I met with accidentally in a subject brought for dissection. Dissection. The original acetabulum is entirely filled with a ligamentous substance, so that the head of the bone could not have been received into it. The capsular ligament is torn from its connection with the acetabulum, at its anterior and posterior junction, but not at its superior and inferior. The ligamentum teres is broken, and an inch of it adheres still to the head of the bone. The head of the bone rests behind the acetabulum on the pyriformis muscle, at the edge of the notch above the sacro-sciatic ligaments. The muscle on which it rests is diminished, but there has been no attempt made to form a new socket in bone for the head of the os femoris.

Around the head of the thigh-bone a new capsular ligament is formed; it does not adhere to the articular cartilage of the ball of the bone which it surrounds, but could, when opened, be turned back to the neck of the thigh-bone, so as to leave its head completely

exposed. Within this new capsular ligament which is formed of the surrounding cellular membrane, the broken ligamentum teres is found. (See Plate.) The trochanter major is rather behind the acetabulum, but a little inclined towards it. This dislocation must have existed, from the appearances of the parts, a length of time; the adhesions were too strong to have admitted of any reduction, and, if reduced, the bone could not have remained in its original socket.

Cause.

This dislocation is produced by force, being applied when the body is bent forward upon the thigh, or when the thigh is bent towards the abdomen; when, if the knee be pressed inward, the head of the bone is thrown behind the acetabulum.

Reduction.

The reduction of the dislocation in the ischiatic notch is generally extremely difficult, and is best effected in the following manner: the patient lies on a table upon his side, and a girt is to be placed between the pudendum and the inner part of the thigh to fix the pelvis. Then the leather strap for the pullies is placed above the knee, upon which a wetted roller is tightly applied. A napkin is to be carried under the upper part of the thigh. The thigh-bone is then brought across the middle of the other thigh, measuring from the pubis to the knee, and the extension is to be made with the pullies. Whilst this is conducting, an assistant pulls the napkin at the upper part of the thigh with one hand, and rests the other upon the brim of the pelvis, and thus lifts the bone as it is drawn towards the aceta-

bulum over its lip. For the napkin I have seen a round towel very conveniently substituted, and this was carried under the upper part of the thigh, and over the shoulders of an assistant, who then rested his hands on the pelvis, as he raised his body and lifted the thigh.

Although the above is the method in which this dislocation is most easily reduced, yet I have seen a different mode practised, and I shall mention it here, as it shews how the muscles, opposing the pullies, will draw the head of the bone to its socket, when it is lifted from the cavity into which it has fallen.

CASE.

A man, aged 25, was admitted into Guy's Hospital, under the care of Mr. Lucas; upon examination the thigh was found dislocated backwards; the limb scarcely differed in length from the other, not being more than half an inch shorter; the groin appeared depressed; the trochanter was resting a little behind the acetabulum, but inclined upon it; the knee and foot were turned inwards, and the head of the bone could in this case be felt behind the acetabulum. An extension was made by pulleys in a right line with the body; and at the time this extension was made, the trochanter major was thrust forwards with the hand, and the bone returned in about two minutes into its socket with a violent snap.

I have already mentioned, that I have seen no instance of a dislocation downwards and

backwards; and when I state that I have been an attentive observer of the practice of our hospitals for thirty years, was also for many years in the habit of daily seeing the poor of London at my house early in the morning, and have had a considerable share of private practice, if such a case does ever occur, it must be extremely rare. I cannot help thinking also, that some anatomical error must have given rise to this opinion, as in the dislocation downwards and backwards it is described as being received still into the ischiatic notch; but this notch is, in the natural position of the pelvis, above the level of the line, drawn through the middle of the acetabulum; and hence it is that the leg is shorter, not longer, when the bone is dislocated into the ischiatic notch.

Of the Dislocation of the Pubis.

Cause.

This dislocation is more easy of detection than any other of the thigh. It happens from a person in walking putting his foot into some unexpected hollow in the ground, and his body at the moment is bent backwards; the head of the bone is thrown forwards upon the os pubis. A gentleman who had met with this dislocation in his own person, told me that it happened whilst he was walking across a paved yard in the dark, and he did not know that one of the stones had been taken up: his foot suddenly sunk into the hollow, and he fell backwards; and when his limb was examined, the head of the thigh-bone was found upon the os pubis.

The limb is in this case an inch shorter than the other; the knee and the foot are turned outwards, and cannot be rotated inwards, but there is a slight flexion forwards and outwards; and in a dislocation which had been long unreduced, the motion at the knee backwards and forwards was full twelve inches; but the striking criterion of this dislocation is, that the head of the thigh-bone may be distinctly felt upon the pubis, above the level of Poupart's ligament, to the outer side of the femoral artery and vein. It feels as a hard ball there, which is readily perceived to move by bending the thigh-bone. Yet although this case is apparently so easy of detection, I have known three instances, in which it was overlooked, until it was too late for reduction. One, of which we have now a preparation at St. Thomas's Hospital; one in a gentleman from the country, in whom it was not discovered until some weeks after the accident. He then submitted to an extension which did not succeed, and came to London to ask my opinion, when I advised him against a further extension, and, indeed, he was himself averse to any other trial. The third was a patient in Guy's Hospital, who was admitted for an ulcerated leg, and was found to have a dislocation upon the pubis, which had happened some years before. It really must be great carelessness which leads to this error, as the case is so strikingly marked.

Symptoms.

Not detected.

I dissected one of these dislocations, and we have it preserved in our Anatomical Collection. It shews changes of parts nearly, but not quite

Dissection,

equal to those in the dislocation into the foramen ovale. The original acetabulum is partially filled by bone, and in part occupied by the trochanter major, and both are much altered in their form. The capsular ligament is extensively lacerated, and the ligamentum teres broken. The head of the thigh-bone had torn up Poupert's ligament, so as to be admitted between it and the pubis. The head and neck of the thigh-bone are flattened and much changed in their form. Upon the pubis a new acetabulum is formed from the neck of the thigh-bone, for the head of the bone is above the level of the pubis. The new acetabulum extends upon each side of the neck of the bone, so as to lock it upon the pubis: (See Plate.) Poupert's ligament confines it on the forepart; on the inner side of the neck of the bone, passed the artery vein and nerve, so that the head of the bone was seated between the crural sheath and the anterior and inferior spinous process of the ilium.

This accident might, by an inattentive observer, be mistaken for a fracture of the neck of the thigh-bone, but the head of the bone felt upon the pubis, will at once decide its nature.

Reduction.

In the reduction of this dislocation, the patient is to be placed upon his side on a table; the girt is carried between the pudendum and inner part of the thigh, and fixed in a staple, a little before the line of the body. The pullies are fixed above the knee, as in the dislocation upwards, and then the extension is

to be made in a line behind the axis of the body, the thigh-bone being drawn backwards. After this extension has been for some time continued, a napkin is to be carried under the upper part of the thigh, and an assistant pressing with one hand on the pelvis, lifts the head of the bone over the pubis and edge of the acetabulum. The following case which occurred in Guy's Hospital, at the time my friend Mr. now Dr. Gaitskill, was a dresser to Mr. Forster, will best exemplify the mode of reduction. He was a dresser in the years 1803 and 1804.

Bath, August 13, 1817.

DEAR SIR,

The report of the case of dislocated thigh, which I have sent you, contains every material circumstance within my recollection; it will afford me much pleasure if you can extract any thing from it useful, or conducive to your purpose.

I remain yours most sincerely,

JOSEPH A. GAITSKILL.

CASE.

A. B. with a dislocation of the os femoris, upon the pubis, was admitted into Guy's Hospital, under Mr. Forster, during the time I was one of his dressers.

The length of the limb was somewhat diminished; the foot and knee turned outwards; but the circumstance which more clearly evinced the nature of the accident was, that the head

of the thigh-bone could be distinctly perceived under the integuments near the groin, where its shape could be ascertained, as well as its motion felt when the thigh was moved. The accident had happened from a slip or fall, he had sustained about three hours before.

With respect to the reduction ; as the man was brought into the hospital in the evening, when Mr. Forster was absent, I considered it my duty to attempt to replace the bone immediately. I therefore ordered the patient to be carried into the operating theatre ; whilst this was doing, I invited my three brother dressers into the surgery, informed them of the accident, and to avoid confusion, requested each to take some particular part in the process of reduction. The patient was placed on his sound side upon a table, the pullies applied to the thigh in the usual manner, and extension began in a straight line, with the design of raising the head of the bone into its socket, but without success. Reflecting then a moment on the mechanism of the bones, and their new relative situation, I changed the line of extension to a little backwards and downwards, and passing a towel over my own shoulders, and under the superior part of the man's thigh, raised it by extending my body.

The leg being kept bent, as from the beginning of the operation, nearly to a right angle with the thigh, I requested one of the dressers to take hold of the ancle, and raise it, keeping the knee at the same time depressed, by which means, the thigh was turned over inwards, and

in a very short time, the head of the bone snapped into its acetabulum.

Dr. Dorsey, a most intelligent surgeon in America, who, I sincerely hope, may continue his professional career with the same ardour and good sense which he has hitherto manifested, mentions a case of dislocation on the pubis, in which the head of the thigh-bone was placed below Poupert's ligament, and the leg was longer, but this was an exception to a general rule.

Of Fractures of the Os Innominatum.

As these accidents are liable to be mistaken Mistaken. for dislocations, and as any extension made for them adds extremely to the patient's sufferings, and endangers the producing fatal consequences if there was previously a probability of recovery, I am anxious to say a few words upon them at this moment.

When a fracture of the os innominatum happens through the acetabulum, the head of the bone is drawn upwards, and the trochanter somewhat forwards, so that the leg is shortened, and the knee and foot are turned inwards: such a case then may be readily mistaken for dislocation. Symptoms. If the os innominatum is disjointed from the sacrum, and the pubis and ischium are broken, the limb is slightly shorter than the other; but in this case the knee and foot are not turned inwards. Of the first of these accidents I have seen two examples; of the latter only one.

Detection.

These accidents are generally to be detected by a crepitus being perceived in the motion of the thigh, if the hand be placed upon the crista of the ilium; and they are attended with more motion than occurs in dislocations.

With respect to the appearances on dissection, they will be seen in the Plates.

CASE.

A man was brought into St. Thomas's Hospital in January 1791, on whom a hogshead of sugar had fallen. Upon examination, the right leg was found about two inches shorter than the left, and the knee and foot were turned inwards. These circumstances induced the surgeon under whose care he fell, to think the case a dislocation, although as he stated the limb appeared to be more moveable than usually happens in such accidents, and there was a great contusion and considerable extravasation of blood. The surgeon used the utmost caution in making a very slight extension, but which did not succeed; and whilst it was performing, a crepitus was discovered in the os innominatum. The man had a remarkable depression of strength and paleness of countenance, and appeared to be sinking. In the evening he died.

Upon examination of the body the following appearances were observed:

The posterior part of the acetabulum was broken off, and the head of the thigh-bone had slipped from its socket; the tendon of the ob-

turator internus and the gemini tightly embraced the neck of the bone; the fracture extended from the acetabulum across the os innominatum to the pubis; the pubes were separated at the symphysis nearly an inch asunder, and a portion of the cartilage was torn from the right pubis, and adhered to that on the left side; the ilia were separated on each side, and the pubis, ischium and ilium broken on the left side; the abdomen contained about a pint of blood, and the left kidney was greatly bruised; the integuments were stripped off the patella and knee on one side, so as to expose the capsular ligament.

In a second case of this kind which was admitted into St. Thomas's Hospital, having the appearance of the dislocation backwards, the patient lived four days. On examination, the fracture was found passing through the acetabulum dividing the bone into three parts, and the head of the thigh-bone was deeply sunken into the cavity of the pelvis. (See plate.)

The following case of fracture and dislocation of the bones of the pelvis, lately occurred in Guy's Hospital: I am obliged for the particulars to Mr. Sandford, who attended to this woman as dresser.

CASE.

Mary Griffiths, aged 30 years, was admitted into Guy's Hospital at 5 o'clock in the afternoon of the 8th of August, 1817. Her pelvis

had sustained a severe injury from her body being pressed by the wheel of a cart against a lamp-post.

A small quantity of blood had been taken from her arm previous to her admission, and as she was very pale, her pulse was extremely weak, and her fæces passed involuntarily, no more blood was drawn.

Soon after her admission, she was examined by placing her on the face, and one of my hands on the back of the right ilium, and the other on the pubis of the same side, a distinct motion and crepitus could be perceived. The posterior spine of the ilium projected upwards, above its usual junction with the sacrum, and it was thought that the ilium was dislocated from the sacrum, with some fracture either of the ilium or sacrum. When she was turned on the back, and examined per vaginam, the pubes were found passing more into the cavity of the pelvis than usual. A large quantity of blood was effused from the last rib to the upper part of the thigh, on the right side.

It was now a question, whether this extravasated blood should not be discharged by making an opening through the integuments, as it appeared to be fluid; but upon consideration, it was thought that the vessels would still bleed, that she could not bear the loss of blood in her weakened state, and that the blood, when coagulated, would form the best security against further effusion. All that was done therefore was, to roll a broad bandage round the pelvis to fix it firmly: to give Tinct. Opii. Gt. xxx. and to draw off the

urine from her bladder, which contained about a pint.

In the evening, the extravasation of blood was somewhat increased, and she complained of a pricking sensation in the right thigh and leg, which induced her to loosen the bandage. She had vomited; her feet were cold; she had severe pain and great thirst; her pulse was 90 and small.

On the 9th, she complained of a sensation of one side tearing from the other, and upon examination of the lower extremities, that on the right side was found shorter than the other; there was numbness also on that side; her tongue was furred, but her pain and thirst somewhat less, and she had not the same coldness in her feet as she had last night.

As her bowels had not been relieved since her admission, aperient medicine was given her, and the bladder being incapable of emptying itself, a catheter was employed. The ecchymosis was of great extent, and it was doubtful if it could be absorbed. A pillow was placed against the right side, to support the pelvis, and another was put under the knee, to preserve the limb in an easy position.

In the evening of this day her pulse was 112; she complained much of pain in the right side and groin, the catheter was again obliged to be used, and aperient medicine to be repeated.

On the morning of the 10th she complained of the bones of the pelvis moving upon each other, even more than at any former period,

and that she had suffered severe pain; the tongue was now furred, her pulse fuller, but her bowels had been relieved, and she had made water without assistance. At one o'clock this day, her pulse being fuller, and 120 in a minute, with great heat of skin, I bled her to the amount of ten ounces, but the blood did not exhibit any signs of inflammation, nor did the loss of blood produce any apparent effect in relieving her symptoms.

In the evening, her pain and fever had increased, and as she complained of the tightness of the bandage which still surrounded the pelvis, it was removed. The catheter was again obliged to be employed. Some saline medicine with opium, was directed for her.

On the 11th, she stated that she had passed a good night; her pulse was 120 and softer; her tongue furred; she was directed to continue her medicines.

A stimulating lotion was ordered her on the 12th, to produce an absorption of the extravasated blood. Some spots appeared of a very dark colour, where the ecchymosis had been most severe, and the cuticle was abraded upon those parts.

On the 13th her report was more favourable; her bowels were open, and her bladder did not require the assistance of the catheter. However she still complained of severe pain in the hip.

14th. As the excoriated parts seemed disposed to slough, a puncture was made through the integuments, nearly opposite to the tro-

chanter major, and a quart of serum mixed with the red particles of blood, and with a substance which appeared adipose, was discharged.

On the 15th her fæces and urine had passed into her bed, and she requested to be removed to another ; her pulse was 112. The puncture made yesterday does not seem disposed to heal, and a poultice was directed for it.

16th. She expressed herself relieved by her removal into another bed ; her pain is less severe ; her pulse but 108. She was now directed a diet to support her strength, and some porter was given her ; but on the 17th, as she had been observed to be slightly delirious the preceding night, the quantity of porter was lessened.

On the 18th, the sloughing of the part which had been excessively bruised, had considerably increased ; yet her tongue was cleaner, and her skin of its natural heat.

On the following day she appeared better ; had passed a good night ; she was ordered a poultice of stale beer grounds to the hip, and as she strongly requested it, she was turned on her left side, as her impression was, it would relieve the pain she felt on the right side.

The sloughing of the superior and posterior part of the thigh had increased upon the 20th ; and she was ordered the decoction and tincture of bark, with saline medicine if her thirst became urgent ; and a more nutritious diet.

On the 21st the sloughing had increased ; the tongue was now furred ; her pulse was 120.

On the 22d she was worse, and on the 23d her stomach rejected every thing; she had a strong impression that she could not recover; she refused her medicine, and the slough had increased.

In the evening of the 24th she died.

Examination.

On the 25th the body was examined.

A fracture was found passing through the body of the pubis on the left side, and through the ramus of the left ischium.

The right os innominatum was separated from the sacrum at the sacro-iliac symphysis, and a part of the transverse processes of the sacrum was broken off, and torn from the sacrum with the ligaments. The cartilage and ligaments of the symphysis pubis were torn, and the left sacro-iliac symphysis had given way; the ligament over it being torn, and the bones separated sufficiently to admit of the handle of a scalpel being received between them.

Blood was found extravasated in the pelvis behind the peritoneum.

JONATHAN SANDFORD.

These fractures sometimes do well.

I have known three instances of fracture of the os innominatum recover: two of these were fractures of the ilium, and the nature of the accidents was easily detected by the crepitus which was perceived upon moving the

crista of the ilium ; the third was a fracture of the junction of the ramus of the ischium, and pubis. In the two first a circular roller was applied upon the pelvis, and the patient freely bled ; but in the latter no bandage was employed.

(To be continued.)

PLATE . 1 .

Fig. 1.



Fig. 5.



Fig. 2.



Fig. 3.

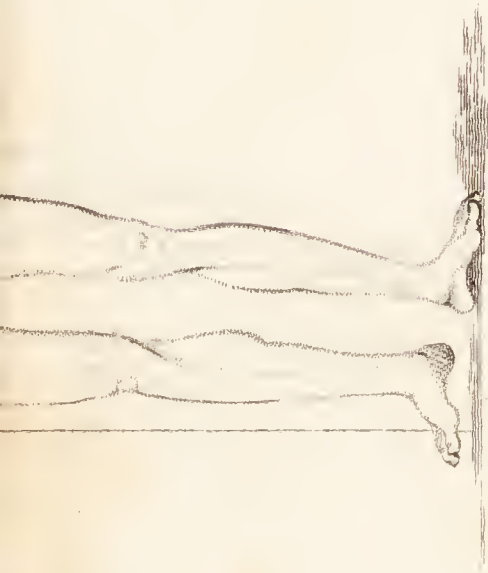
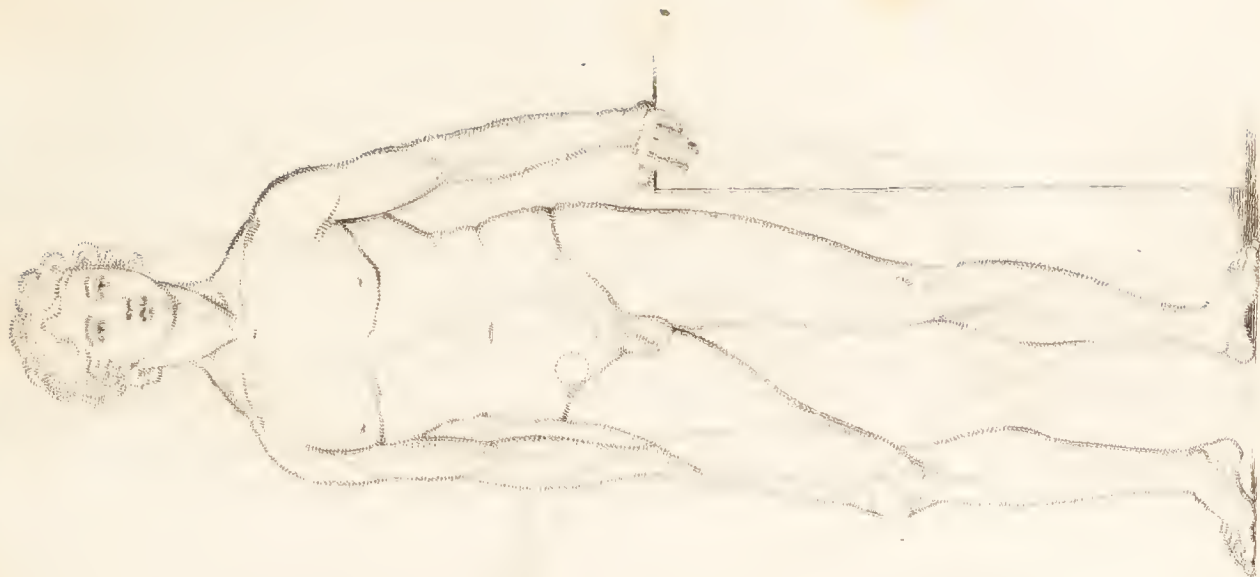


Fig. 4.



EXPLANATION OF THE PLATES.

PLATE I

Shews the position of the limb in the different species of injury to the hip.

Fig. 1. The dislocation upwards on the dorsum iliī: the leg is shortened; the knee and foot turned inwards.

Fig. 2. Dislocation downwards in the foramen ovale; the limb is longer than the other; the body bent forwards, and the knee advanced.

Fig. 3. Dislocation backwards, or in the ischiatic notch; the leg is from half an inch to an inch shorter than the other; the knee and foot turned inwards.

Fig. 4. Dislocation forwards on the pubes; the leg is shorter; the knee and foot turned outwards; there is a prominence at the groin.

Fig. 5. Fracture of the neck of the thigh-bone; the leg is shorter; knee and foot turned outwards; the fracture within the capsular ligament generally occurs in persons considerably advanced in years; the leg in this case is capable of being pulled down to the length of the other; but is immediately drawn back by the action of the muscles.

PLATE II.

Views of Preparations of the different
Dislocations.

Fig. 1. Dislocation in the foramen ovale; *a, a*, ilia; *b*, ischium; *c*, pubes; *d*, foramen ovale; *e*, acetabulum; *f*, sacrum; *g*, thigh-bone; *h*, new acetabulum receiving the head of the thigh-bone; *i*, old acetabulum.

Fig. 2. Another view of the same preparation; *a*, ilium; *b*, old acetabulum much diminished; *c*, new acetabulum; *d, d*, thigh-bone, with a portion of the new acetabulum upon it, which was obliged to be broken to remove the thigh-bone from its new cup.

Fig. 3. Dislocation in the ischiatic notch; *a*, ilium; *b*, tuberosity of the ischium; *c*, thigh-bone; *d*, trochanter major; *f*, head of the bone; *g*, new capsular ligament; *h*, torn ligamentum teres.

Fig. 4. Dislocation on the pubes; *a, a*, ilia; *b, b*, pubes; *c, c*, ischia; *d*, thigh-bone; *e*, trochanter major in the acetabulum; *f*, head of the thigh-bone; *g, g*, new acetabulum.

Fig. 5. The same preparation of dislocation on the pubes with the thigh-bone removed; *a*, ilia; *b*, pubes; *c*, ischia; *d*, old acetabulum; *e*, new acetabulum upon the os pubis.

Fig. 6. Fracture of the acetabulum; *a*, broken pubes; *b*, ilium broken; *c*, fractured ischium.

Fig. 1.



Fig 2.



Fig. 3.



Fig. 6.



Fig. 4.



Fig. 5.



PLATE 3.

Fig 1.

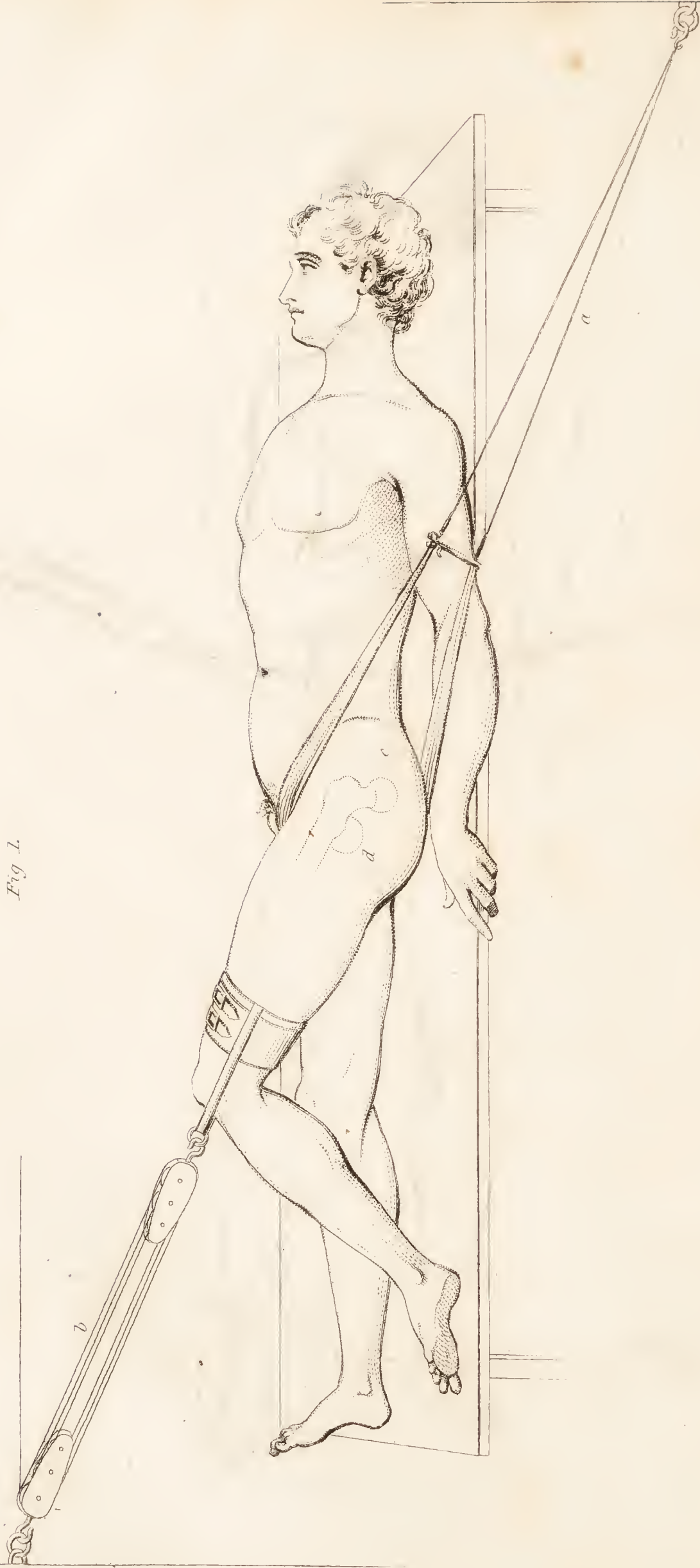


Fig 2.

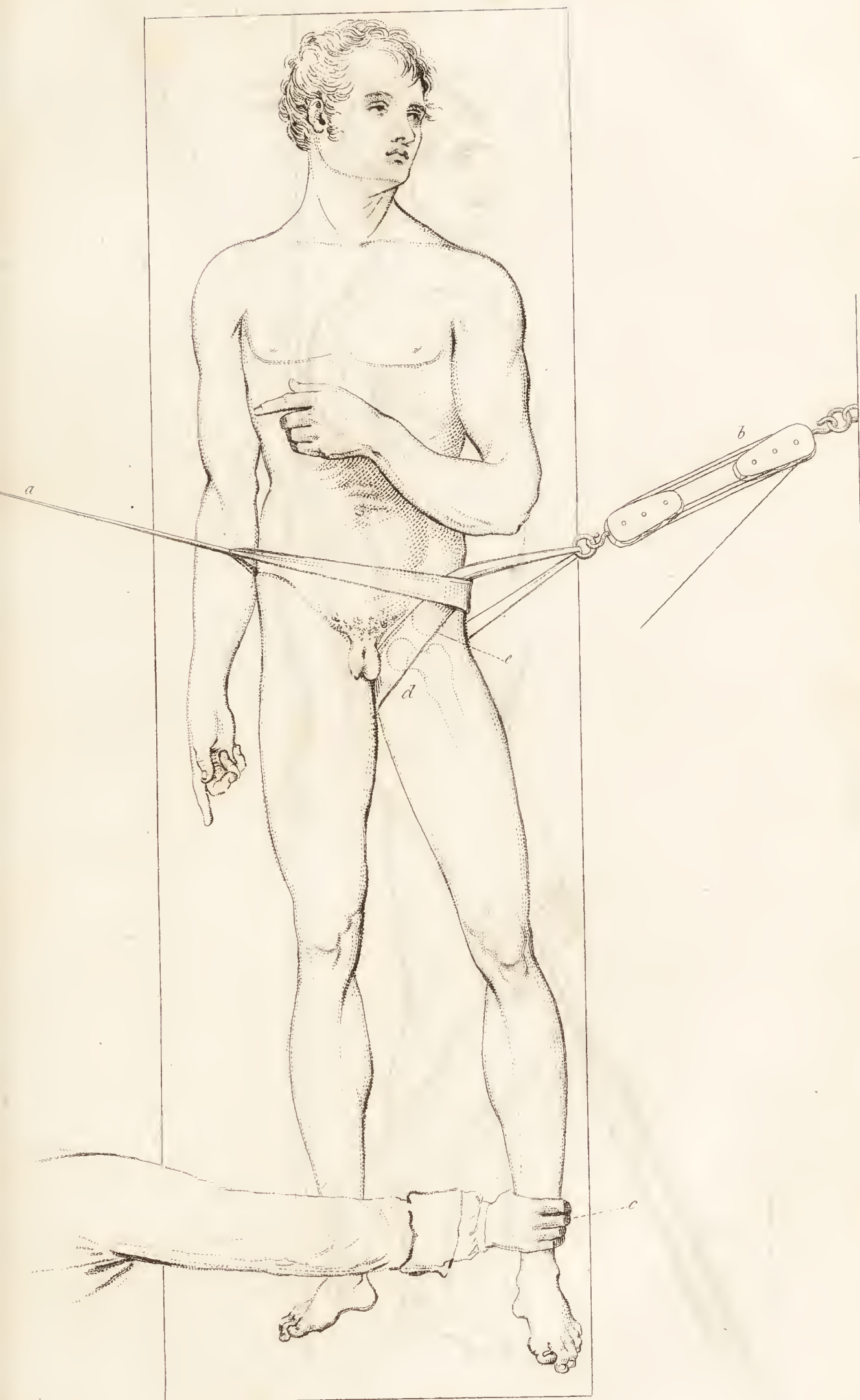


PLATE III.

Fig. 1. Shews the dislocation upwards on the dorsum ilii, and the position of the bandages required for its reduction ; *a*, the belt which fixes the pelvis, and which passing between the thighs is tied above the ilium and fixed to some immoveable body ; *b*, the pulley fixed above the knee and to a screw on some fixed body ; *c*, head of the thigh-bone on the dorsum ilii ; *d*, acetabulum.

Fig. 2. Dislocation downwards in the foramen ovale ; *a*, the belt to fix the pelvis ; *b*, the belt for the pulley which passes between the thighs and between the belt *a*, and the body so as to fix both ; *c*, the hand of the surgeon grasping the leg to bring it across the other as the extension is made at *b* ; *d*, the head of the thigh-bone ; *e*, the acetabulum.

PLATE IV.

Fig. 3. Dislocation backwards or in the ischiatic notch; *a*, belt fixing the pelvis carried between the thighs; *b*, pullies fixed above the knee; *c*, a belt fixed around the upper part of the thigh to place the hand under and to raise the thigh-bone from the pelvis, as the extension is making with the pulley, so as to lift the head of the bone over the edge of the acetabulum; *d*, acetabulum; *e*, head of the bone in the ischiatic notch above the level of the centre of the acetabulum; patient is placed on his side.

Fig. 4. Dislocation on the pubes, or forwards and upwards; *a*, belt to fix the pelvis; *b*, pulley fixed above the knee; *c*, belt or handkerchief fixed around the upper part of the thigh to lift the head of the bone during the extension over the edge of the acetabulum; *d*, head of the bone; *e*, acetabulum; patient is placed on his side.

PLATE 4.

Fig 3.

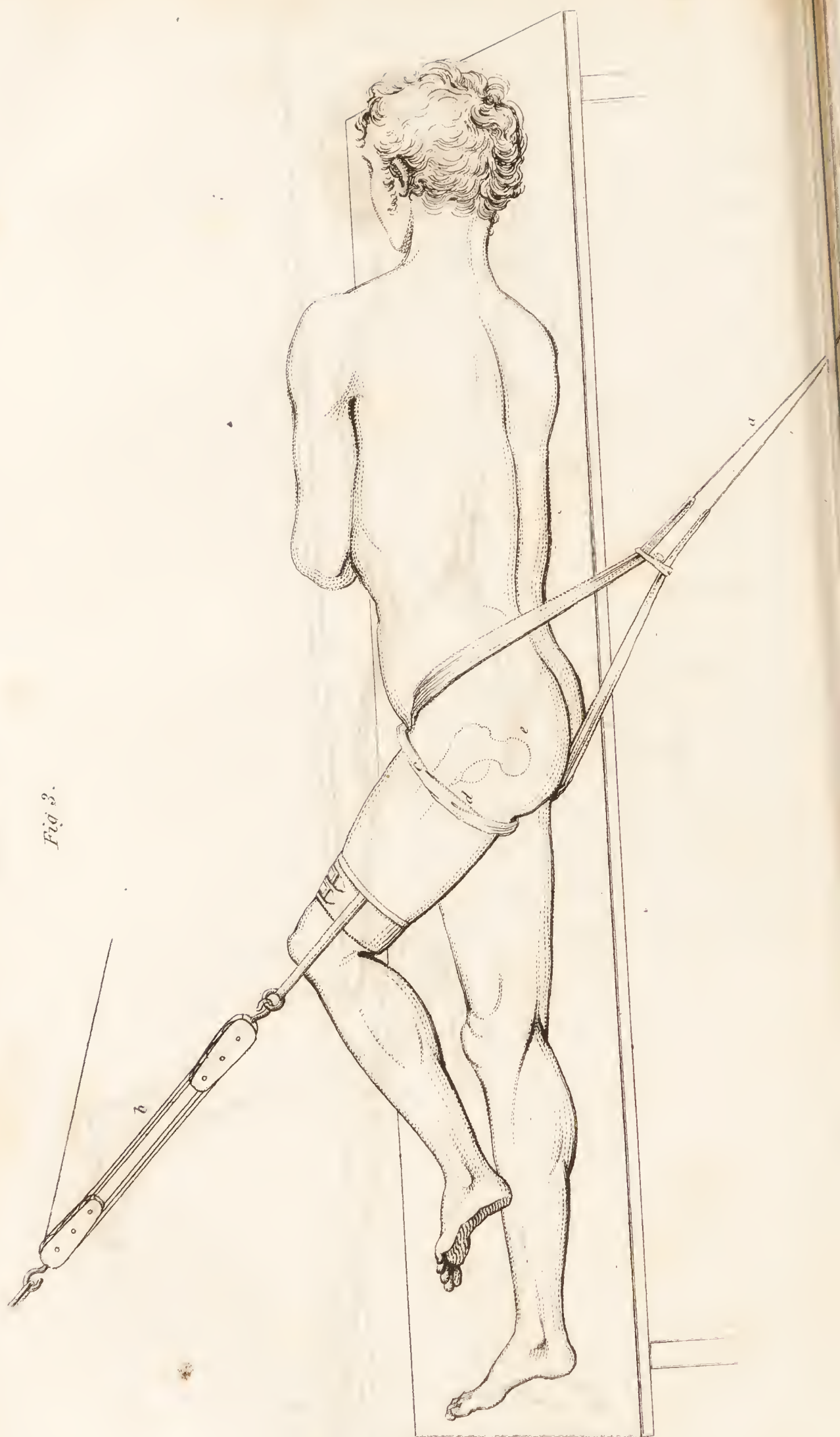


Fig 4.





Fig. 1.



Fig. 2.



PLATE V.

Fig. 1. Shews the effects of a disease in the hip-joint, as producing absorption of the acetabulum, and a new socket for the head of the thigh-bone; the head of the bone is in these cases also partially absorbed and altered in its figure; *a*, new surface for the head of the thigh-bone: *b*, original acetabulum.

Fig. 2. Fracture of the pelvis and laceration of the sacro-iliac symphysis, as described in the case given me by Mr. Sandford; the os pubis is broken and the branch of the ischium; the right sacro-iliac ligament is torn away, and the ilium rises upon the sacrum; the left sacro-iliac symphysis is also torn; *a*, the ilium disjointed from the sacrum; *b*, ligament and cartilage torn on the opposite side; *c*, ramus ischii broken; *d*, pubes fractured.

ON

IRITIS.

BY MR. TRAVERS.

THE interior tunics of the eye are subject to inflammation, arising either as an idiopathic affection, or from the extension of protracted inflammation of the superficial tunic. The effects of this inflammation are conspicuous in the iris, and by the term "Iritis" I mean to express the deep seated inflammation of the eye.

It appears in company with rheumatism of the chronic form, sometimes with gout; with the constitutional signs of the lues venerea; and during or following the action of mercury upon the system.

It is in reference to the two latter associations of the iritis, that I propose principally to consider the disease in this essay.

Although the cases of iritis co-existing with sore throat, cutaneous eruptions, and nodes, which are regarded and successfully treated as venereal, are too frequent to escape observation, the iris is not mentioned by Mr. Hunter and other pathologists as a part subject to be affected by the syphilitic poison*.

I have met with cases in which the mercurial action had been set up for primary lues, and the iritis was present, unaccompanied by any secondary symptom of that disease. I have also met with cases of iritis in which pains

Combina-
tion of iritis
with mer-
cury in the
system.

* Mr. Hunter is not singular in questioning the existence of a venereal ophthalmia.

confined to the joints have been accompanied by eruptions widely differing from those which have been commonly considered venereal. Its occurrence, indeed, during the use of mercury, is so well established and familiar a fact, among persons who see much of ophthalmic diseases, that their first inquiry of a patient labouring under inflammation of the iris is, not whether he has recently contracted syphilis, but whether he has been taking mercury. For although the iritis is frequently met with where no mercury has been taken, it is scarcely ever seen as a sequela of syphilis, where mercury has not been exhibited so as to affect the system; and I think it is more frequent as a consequent upon the use of mercury, than occurring as an idiopathic disease. Under this denomination I do not include those frequent affections of the choroid and iris, which are plainly depending upon the duration and extension of superficial ophthalmia.

Under these circumstances, it is not surprising, that some surgeons of reputation should be disposed to deny, that the inflammation of the iris is a venereal inflammation, and should consider it as belonging to that class of symptoms which resemble, or are grafted upon, the syphilitic, and that others should regard it as an inflammation produced by the poison of mercury.

It appears to me at present impossible to pronounce whether the iritis, so frequently presented after sores on the genitals, and accompanied by eruptions, is the effect of a morbid poison, or of the mercurial poison; or thirdly,

the casual effect of exposure to an exciting cause in a state of predisposition from the mercurial impregnation of the system.

We have no means of tracing the *course* of a morbid poison, beyond the absorbent system of the part in which it is secreted. The sore, the inflamed absorbent, and the gland in which it terminates, comprise the extent of our observation of its progress. Having passed this barrier and entered the circulation, the circumstances by which its re-appearance here or there is determined, are as much hidden from us as the cause of its re-appearance. But having entered the system, and extending to the skin, throat, and even bones, it would be difficult to assign a reason why the eye, or any other organ, should be out of the pale of its operation. And although we speak of venereal inflammation, we are not in possession of any means whereby to demonstrate and distinguish this from common inflammation. The lymph effused upon the iris is as probable an effect of venereal inflammation, as when it is deposited upon the periosteum.

Course of a secreted poison indefinable.

The sympathy or consent which obtains between certain parts, appears to influence the course of their diseased actions, whether simple or sui generis. The throat, skin, and bones, are observed to be affected by the poison of mercury as well as of lues, and also by that which resembles lues, except in its curableness by other means than the use of mercury. It is remarkable that the eye frequently forms a link of this chain, or in other words, that the inflammation of the choroid and iris, coexists with

Apparently influenced by sympathy.

affections of the throat*, skin, and bones; whether these are referred to syphilis, pseudo-syphilis, mercury, or rheumatism. It is also remarkable, that the remedy which exerts the most powerful and obvious effect upon the inflamed periosteum and skin, acts with the same remarkable efficacy upon the inflamed tunics of the eye and *vice versâ*. Depositions beneath the periosteum, resembling nodes, and eruptions on the skin, are not less certainly induced, by the poison of mercury, than is the deposition upon the choroid, ending in incurable amaurosis.

The two following cases afford a brief explanation of the statement, that the consent between certain parts probably influences the course of diseased actions, simple or specific; and I am inclined to believe, that this is the explanation of some at least of the cases resembling syphilis, which are occasionally cured without the use of mercury.

CASE.

A young gentleman of particularly correct conduct, and retired habits, while upon his voyage from the West Indies to this country, for the purpose of education, was troubled with a sore upon the penis, which occasioned him much anxiety, as he had never yet indulged in sexual intercourse, and was wholly unable to account for it. On his arrival he applied to a

* “ There is in fact a general tendency to sore throat, and even to affections of the eyes in all the varieties of cutaneous eruptions, which are accompanied with any degree of fever.” Bateman’s Synopsis, Note, p. 333.

confidential friend, stating the circumstance. His skin was shortly afterwards covered with an eruption, which yielded only to a course of mercury.

CASE.

A married gentleman of character, whom I well knew, applied to me with a paraphymosis and superficial ulceration behind the corona glandis; in which case I know that no venereal commerce had taken place, nor had any mercurial medicine been employed to affect the system. It began in consequence of a hair having accidentally applied itself around that part. Six weeks after the healing of the sore, the whole cutaneous surface exhibited a plentiful crop of pustular eruptions. There were present at the same time, an inflammation and soreness of the membrane of the fauces, severe pains in the bones and joints, and enlargement of the bursæ upon the olecrana of the elbows.

These symptoms slowly disappeared under the use of the plummers' pill, by which the system was slightly affected.

The analogy which has been observed in the morbid actions of parts possessing similar texture, does not appear to influence the course of these actions, otherwise than by continuity. The morbid affections of the skin, mucous, serous, synovial membranes, are of this description; the similarity of their diseases respectively, is, with reason, referred to the similarity of their textures; but the principle of consent, which determines the election of parts in the

Not influenced by relations of texture.

progress of disease, or in other words, the course of the disease, defies the relations of texture, and is referrible to some other cause. There is little anatomical resemblance between the skin, periosteum and choroid, and at all events we may conclude, that the course of a morbid poison is not restricted by relations of texture.

Perplexity
of the sub-
ject arising
from the
use of mer-
cury.

It appears then, that the difficulty of deciding the question, whether the iris is inflamed by the poison of syphilis, arises, not from any theoretical objection, but from the complication of the cases, which are presented to us, by the employment of another powerful agent on the constitution; and that, until we see the course of the syphilitic poison, genuine and unsophisticated, we shall be unable to determine the point. This, in truth, is the cause of the obscurity that overhangs the whole subject of the venereal disease. It is perhaps impossible to say to which, of two agents, the effects belong, which manifest themselves at a period, subsequent to their successive introduction, as we presume, into the system. Both, we are taught to believe, cannot be at the same time active; but both may be present, or one only may in fact have entered the system. When mercury is exhibited, as it almost constantly is, before the constitutional signs of lues appear, what demonstration can be had of the existence of syphilis in a secondary form? or, on the other hand, who in his own case would, *a priori*, abandon the operation of mercury, in confidence that the symptoms which are occasionally referred to its operation, are wholly independent of the poison of syphilis?

Origin of
iritis from
mercury.

In considering whether mercury acting as a

poison upon the system can be a cause of the iritis which so often follows its use, we should bear in mind that although we rarely see the disease unpreceded by mercury, we as rarely see it unpreceded by primary symptoms of lues. It would be unfair to refer it to one rather than the other as far as this evidence goes. But I have satisfied myself of the frequent origin of the disease, while the system has been fully charged with mercury; the sore on the penis for which it was exhibited having long since healed, and no after symptoms of lues being to be discovered. I have also seen it where the system had been mercurialized for gonorrhœa. During the free exhibition of calomel in strumous inflammation, I have repeatedly seen the iris take on the inflammatory action, and while the cure of the iritis was daily accomplishing by the action of mercury in one eye, it has been common to observe the inflammation beginning in the other, as if the action produced effects diametrically opposite upon the sound and the inflamed part. When a person is attacked with ophthalmia, whose system is charged with mercury, the inflammation is never confined to the conjunctiva, but invariably affects the deeper tunics, so far as my observation goes. Yet I have never seen the iris affected in cases of eczema mercuriale, but always the conjunctiva of the eyelids. With what I have considered to be the mercurial sore throat, very unlike the venereal, and mercurial eruptions, and nodes, I have repeatedly seen it in conjunction. But, with one exception, I do not call to mind a well ascertained case of primary iritis, during the con-

stitutional action of mercury for a disease in which the genitals had had no concern, as enlargement of the liver, &c. Were it not for this observation, one would be led to conclude that mercury in certain habits affected the highly organized membranes of the eye, as we occasionally see it affect the skin, and as other substances, by whatever channel they enter the system, attack certain organs and parts; as cantharides and turpentine the neck of the bladder, arsenic the stomach, and lead the intestinal canal.

Or predisposition from mercury.

Whether the iritis following the use of mercury is simply an effect of accidental exposure to cold, and other exciting causes in a state peculiarly susceptible of inflammation, or whether it be due to a cachexia, which the poison of syphilis or of mercury or both have engendered, is a remaining ground of inquiry.

The pains, I have repeatedly observed, which accompany this inflammation, are of a rheumatic character, exclusively affecting the joints and muscles; in general an interval or intervals have elapsed, in the progress of an ill-conducted or protracted course, in which the patient has been exposed to cold and damp before the appearance of the disease, and hence it is least frequent in the better class of patients. And although I have sometimes found sores on the penis and buboes in company with the iritis, the pains, or eruptions, or both have usually been present, and the patient has been more or less under the influence of mercury before the eye was inflamed. The inflammation of the eye and eruptions, which yield eventually to the same remedy, are subject to relapse, and make their

reappearance together; the pains are sometimes relieved, often aggravated, and seldom if ever removed by its use. The two former yield in a marked degree to the nitric acid, but the ophthalmia recurs and requires mercury for its cure. The sublimate given in very small doses as a tonic, is likewise inadequate to its cure.

Before I enter upon the subject of the treatment, it may be right shortly to describe the appearances of this disease, although I have little to add on this subject to the very accurate observations of the late Mr. Saunders, now well known to the profession. In the recently inflamed iris the inflammation is characterised by diffused vascularity of the conjunctiva, and the sensibility of the organ is in proportion acute. The fine hair-like vessels of the iris are injected with red blood, and although the pupil undergoes less alteration than is natural from the changes of light upon the eye, it is not misshapen, or very slightly deviates from the circle; nor is there in an early stage of the disease any visible lymphatic deposition within the chamber or upon the face of the iris. Sometimes specks of extravasated blood are perceptible upon this membrane. The pain is chiefly affecting the eyeball, and is accompanied with a sense of pressure as if the globe was too large for its socket. In that which is more advanced, as in the primary iritis, the fibres of the iris are agglutinated, its pupillar edge is thickened and immoveable, a boss or a layer of lymph is discerned upon it, the vascularity of the conjunctiva is less, the bright florid colour of the blood-ves-

Common
appear-
ances of
iritis.

sels being exchanged for one of a deeper and more purple cast. The vessels on the sclerotic run in converging lines from all sides of the visible hemisphere of the globe, and form a remarkable vascular zone at the circumference of the cornea. This appearance is probably increased by the turgescence of the vessels of the ciliary plexus, and the preternatural freedom of anastomosis between the superficial and deeper seated orders. The pupil is square, oblong, rhomboidal or a polygon, and a boss or tubercle of lymph is deposited upon one or each of the angles which are formed in its margin. Sometimes one large projecting lump is seen; in other cases the whole rim of the pupil is fantastically fringed or tufted. The lymph is sometimes deposited upon the centre of the iris, sometimes on the verge of the pupil, seldom on its ciliary border. In this state the pain is that of hemicrania, aggravated by paroxysms, and most intolerable at night.

Chronic
form of the
disease.

There is a slow inflammation of the iris which differs from the acute form, chiefly in its very gradual access, its comparatively moderate pain, and that affecting only the ball and region of the orbit; the very slight degree of superficial vascularity; the membranous form and sparing quantity of lymph effused, or its actual imperceptibleness; the frequent concomitant affection of the cornea with minute and superficial herpetic ulcers, of a brown colour. The iris loses its colour more or less under inflammation, and where lymph has been deposited and organized upon the uvea, never recovers it; the pigmentum nigrum, upon

which it depends, being defective or no longer secreted.

The inflammation of the eye after syphilis is not, so far as I have observed, characterized by any peculiarities, so much as the shade of colour of the inflamed conjunctiva and sclerotic, and the appearance assumed by the deposited lymph. The former have a brickdust or dusky red, instead of a bright scarlet hue, and the lymph is compact and brown, and intimately adhering to the iris, instead of curd-like, loose, and of a yellowish white colour. When the conjunctiva is highly vascular and florid, as in common ophthalmia, and the lymph is diffused, white, loose in texture, and puriform in appearance, especially where the cornea is at the same time clouded, and the eye very irritable to light, I have considered the case to be essentially unconnected with syphilis. I do not however feel quite confident of the accuracy of this opinion. The irritability of the eye to the light has been considered as diagnostic, and it certainly is so, between the primary iritis and that which ensues upon or is accompanied by acute inflammation of the conjunctiva. In the latter case the cornea is hazy, and the aqueous humor turbid; yet the vision is not more affected than in the inflamed iris, which has proceeded to the deposition of lymph.

Peculiarities after syphilis.

The treatment of the disease, which is fortunately one of the best ascertained points in pathology, would seem to throw light upon its origin; but the habit of reference to the remedy in order to ascertain and class the disease, appears to me a proceeding altogether unscientific and

Remedy no clue to the disease.

erroneous. To consider that the symptoms which mercury cures are *therefore* syphilitic, and that those which it does not cure are not so, is to abandon altogether the analytical investigation of disease. How many diseases essentially different are cured by the same remedy! How confused and useless for the purpose of diagnosis, which is the sum and substance of rational practice, would be a nosology framed upon such a basis! That the effect of remedies is important as an adjuvant to the study of nosology, may be admitted, but it can never be allowed to form a part of the *historia morbi*, much less to assume the importance of a diagnostic.

Heads of
cases.

The following are the heads of a few of the cases cured under my observation of the iritis regarded as venereal, which I introduce merely to shew the combination of symptoms.

1. *Holton*.—Syphilitic eruptions.
2. *Vallence*.—Copper-coloured, elevated, and scaly eruptions on the back and limbs; had primary sores followed by buboes six months ago.
3. *Younger*.—Tubercular eruptions on the face, arms, and legs, of a copper colour, with desquamation of the cuticle. Had sores on the integument of the penis a year ago. The sores healed, and broke out afresh three or four times successively. Had no bubo, and reports that no remedies had been employed.
4. *Neale*.—Secondary symptoms of lues.
5. *Glover*.—Venereal eruptions and pains.
6. *Riddington*.—Syphilitic ulcer of the throat. Nocturnal pains.
7. *Topham* —The same.

8. *Brown*.—Chancre followed by bubo six weeks ago. Nocturnal pains.

9. *Wyatt*.—Syphilitic eruptions and pains.

10. *Dudley*.—Pains and node of the os frontis ; first the left, and afterwards the right eye affected.

11. *Poole*.—Eruptions. Ulcerated throat. Nocturnal pains.

I have selected the following for detail.

CASE.

Feb. 8, 1816.—Joseph Wade, aged 30, was attacked some weeks since with inflammation of the left eye, while under salivation for a venereal ulcer of the velum palati, by which the ulcer was healed. The eye has the following appearances. The conjunctiva is generally vascular, but especially so around the cornea, where the vessels form a distinct zone. The iris, not altered in colour, has little if any motion, and the pupil, though not much contracted, is irregular in its circle from adhesive inflammation. Vision dim.

Iritis during salivation for ulcer of the throat.

Ordered: Hydrarg. submur. gr. ii. opii gr. ss. f. pil. noc. mane q. sumend.: H. aper. p. r. n.

20.—Mouth moderately sore. Inflammation of the eye subsiding rapidly. Contin. pilulæ.

March 7.—Discharged cured.

Note.—After his discharge Wade returned to his business as a groom, and was attacked with chronic rheumatism, and a relapse of the ophthalmia; the latter was superficial, and readily yielded to leeches and purgatives. His pains were relieved by a course of the pulv. ipecac. comp. in small doses, and the decoct. sarsap. He attributed these complaints to cold caught in washing his horses' feet.

CASE.

Iritis, with
eruptions,
after sore
on the penis.

March 23, 1816.—James Basnell, aged 40, had a sore on the lips of the urethra five months ago. He is not certain whether the medicine he took was mercurial; his mouth was not affected. Three months afterwards an eruption appeared on his breast; this is now generally diffused over the body; it is small, elevated, scaly, and of a pale brown colour. About a month after the appearance of the eruption, the left eye became inflamed. Topical means were chiefly employed, and the inflammation gradually subsided, but the vision was lost. At present the iris adheres to the opaque capsule of the lens, the pupil is misshapen and fixed, and whitish radii are perceptible upon the iris converging to the pupil. Three weeks since the right eye inflamed. The conjunctiva is red, and the vessels are most condensed around the cornea. Upon the iris, which is very vascular, they are seen passing, like rays to a centre, to the contracted pupil. Flakes of lymph appear upon the iris, and there is one remarkable lump which nearly reaches the cornea, and is reddened around its base, as if beginning to be organized. Although the cornea is clear, the humors appear thick, and the vision is much impaired. He has little if any pain from exposure to light, but much at night.

Ordered: Hyd. submur. gr. i. opii gr. $\frac{1}{4}$ f. pil. quater indies sumend.

April 1.—Mouth slightly sore. Eruption fading. Inflammation of conjunctiva has subsided, the aqueous humor has recovered transparency, and the lymph is much diminished

in bulk. Sight greatly improved. Contin. pilul. et applic. extra. belladonnæ per noctem region. supra-orbitali.

20.—The eruption and lymph on the iris have disappeared. The pupil is still irregular, but the eye clear and sound, and vision restored. Discharged.

CASE.

Sept. 26, 1816.—Thomas Edmonds, aged 17, had sores on the penis about ten months ago, which healed under mercurial dressings and pills, his mouth being gently affected for about a month. At this time he had a slight inflammation of the right eye, attributed to a cold, which was succeeded by eruptions in various parts of his body. The ophthalmia increased, attended by dimness of vision and pain in the head, and a crop of warts made its appearance on the glans penis. For these complaints he took a full course of mercury at Guy's Hospital, and was discharged free from complaint. After leaving the hospital, he was frequently exposed to the vicissitudes of the weather, and the ophthalmia and eruption recurred. At present he has phymosis from warts. The conjunctiva of the left eye is very vascular, and on the lids granulated. The iris is much discoloured, and adhering to the capsule of the lens, which is partially opaque; the pupil is contracted and irregular, and several lumps of lymph effused in the anterior chamber, are undergoing vascularization; one in particular, pendulous from the upper border of the pupil, is distinctly organized. The eruptions are herpetic, in circumscribed clusters on the arms,

Iritis, with eruptions, after salivation.

shoulders, and back ; on the face more diffused, but of the same character. They incline to scurf, do not itch, and are of a copper colour.

Ordered : Arteriotomia ad ζ xvj. : Ung. hydr.

Oct. 5.—Mouth has been affected two days. Eruptions are altered in appearance. Conjunctiva has lost its excessive vascularity. Lymph reduced in bulk, but more coloured. Applic. belladonna.

9.—The lymph nearly absorbed. Capsule completely opaque, and vision extinct. Eruptions faded.

16.—Lymph absorbed. The belladonna has had no effect upon the pupil.

23.—Eruptions have disappeared. The phymosis is reduced by an injection of the lot. nigra. Warts to be excised, and the surface washed with the lot. sulphat. cupri.

26.—Slight relapse of inflammation of the conjunctiva. Applicentur hirud. palpebris. Ordered to wash up.

30.—The eye free from inflammation. Opaque capsule becoming vascular. Discharged.

CASE.

Iritis, with pains, after long and irregular course of mercury.

November 7, 1816.—Robert Hughes, aged 23, had a chancre last March, which was healed under a course of mercurial pills and an application of the lot. nigra. A bubo existing at the same time disappeared. Two months after the healing of the chancre, he was attacked with pains in his joints, which have continued till this time. He has been taking mercury irregularly since March, and his mouth has been frequently

affected, notwithstanding his habitual exposure to the weather. Three weeks since, his right eye became inflamed, and the inflammation still exists. Besides unusual, diffused, and excessive redness of the conjunctiva, a copious deposit of soft flocculent lymph has taken place in the anterior chamber, and appears mixed with the aqueous humor. The iris is clouded, and there is also a slight nebula of the cornea. He complains of violent deep-seated pain in the eyeball, orbit, forehead and temples. Light falling on the eye gives much pain. He has eruptions on his arms, back and breast, but no pains in his bones.

Ordered: Arteriotomia ad $\text{̄}xvi.$: Ung. hydr.

12.—Mouth slightly affected. Pain abated.

20.—Mouth very sore. Eye much improved in all respects; pain of the eye and joints has left him; sees much better. Eruptions fading.

Dec. 4.—Continues improving.

11.—Ordered to wash up. Vision good. Pupil irregular, notwithstanding the use of belladonna.

CASE.

January 30, 1817.—Elizabeth Scarlett, aged 18, had sores on the pudendum and a bubo in each groin fourteen months ago, for which she rubbed in mercurial ointment for five and thirty successive days. She continued free from complaint until three months since, when she was attacked with pain in the joints, exacerbating at night, and eruptions in various parts of her body. Shortly after the eyes inflamed, with the left of which she has been unable to see for several

Iritis with pains and eruptions after salivation.

weeks. The iris of this eye is deeply inflamed, a zone of chocolate-coloured lymph surrounding the pupil; and eruptions of a dingy red colour are sparingly diffused over the face, arms, back, thighs, and legs, commencing in small white vesicles, which break, and are succeeded by reddish brown laminæ of cuticle.

Ordered: Ung. hydrarg.

Applicentur hirud: vj palpeb. Plumb. superacet. ʒj. aquæ ʒvi. M. f. collyrium.

Feb. 10.—Mouth sore. Ophthalmia and eruptions declining.

19.—Mouth very sore during the last week. Pains much relieved and eruptions faded. Vision of the affected eye is permanently impaired, but the lymph is taken up, and it is quite free from inflammation.

March 12.—Discharged cured.

CASE.

Iritis with pains and eruptions after a course of mercury.

January 30, 1817.—William Warren, aged 26, eighteen months ago had primary sores, which healed under mercury taken for seven weeks, and were succeeded by pains in the elbow and knee joints. Two months since contracted a second infection, for which he again took pills for several weeks; the sores healed, but he was exposed to cold, and his present complaints appeared, ushered in by febrile symptoms. His face, hairy scalp, arms and hips are covered with a distinct pustular eruption of a very pale rose colour in the face, but darker in the other parts. The conjunctiva of the left eye is very generally vascular, the aqueous humor slightly

turbid, and vision is impaired. The iris is free, but the inflammation is deep seated. He has pains in the elbows and knees, which are worst at an early hour of the morning. Health unimpaired.

Ordered: H. aper: Acid. nitros. d. gtt. xx. ter die sumend: Pil. hydra. g. iii. extr. rhei g. v. M. f. pil. om. nocte maneque sumend.

Feb. 5.—Little alteration.

20.—Mouth not sensibly affected. Eye much improved. Eruptions disappearing. Contin. medic.

March 1.—Relapse of inflammation. The sclerotic and choroid are now evidently affected. Eruptions gone, leaving small red indentations.

12.—Inflammation has subsided. Pupil not insensible to light. Vision pretty good, but is troubled with muscæ volitantes.

22.—The pupil is contracted, and there is a slight capsular opacity. Extr. belladonnæ.

29.—Since the use of belladonna, the iris is become inflamed. The pupil is of an irregular oblong shape, and lymph is copiously effused around its margin, with a distinct tubercle on the lower edge. No pain in the head. Omit-tantur medic. prescript: Hydrarg. submur. giss. opii $g\frac{1}{4}$. M. f. pil. ter die sumend.

This man was discharged cured after ptyalism of three weeks. Vision good. Pupil slightly irregular.

The iritis first described, which often super- Treatment.
venes upon indecisive or mistaken treatment of the inflamed conjunctiva, or upon some imprudent use or exposure of the eye in this state, is cured by large and repeated blood-letting, and

active purgatives. All the other forms of iritis, whether primary or secondary, simple or specific, require the constitutional use of mercury for their cure, without exception. This may be boldly stated without reference to the origin of the disease, and I should be quite at a loss to name any other disease which so certainly, and so rapidly, yields to a stated remedy. The only cases, of a vast number that have fallen under my observation, in which mercury disappointed my expectations, have been those of very elderly or debilitated persons, who were incapable of bearing the remedy; for whoever has seen much of the use of this mineral, must be aware, that a certain degree of power is required to enable it to produce its salutary effects, although I have observed, that in these cases, prudently managed, a less quantity will suffice. Cases frequently occur of syphilis, combined with scrofula, where mercury cannot be borne until the system has been prepared by tonic medicines and regimen. I have been repeatedly obliged to adopt this plan with patients before sending them to the foul wards, and with the best effect. In one remarkable case, the patient, a sailor, whose body was covered with elevated, dense, and dry scabs, lamellated, and resembling horn, was compelled to substitute the nitric acid for the blue pill three times successively before he could bear the continued use of mercury, under which he at length obtained a cure. Of this fact, if it were necessary, I could mention many other examples; more than one in which not only the affected organ but life itself has been lost from the patient's inability to support the remedy.

In such cases the mercury should at first be given in very reduced quantity, and remitted or gradually augmented according to the patient's strength.

The beneficial use of mercury in iritis, is an observation of but few years' date*. Its use was still more recently confined to the cases which were combined with traces of the syphilitic poison. But averse as are European practitioners, from education or prejudice, or both, for they are not always unconnected, to introduce mercury into the system during a state of active inflammation, it is now by a multitude of facts incontestably established as a remedy of unfailing efficacy in the most acute form and in every variety of inflammation of the iris. The ascertainment and promulgation of this fact are due to the infirmary of this metropolis for diseases of the eye, and in the catalogue of modern contributions to medical science, except the practice of vaccination, I know of none entitled to rank before it.

Recent employment of mercury in iritis.

It is scarcely necessary to remark, that in the active and early stage of acute inflammation, blood-letting and purgatives should be premised and repeated as circumstances indicate. If the adhesive inflammation is already far advanced before the mercurial action is induced, opacity of the adhering capsule cannot be prevented, nor can such opacity be removed, and hence a motive to its early employment.

* Dr. Beer, of Vienna, in a work entitled 'Principles of the Diseases of the Eye,' published in 1813, describes as distinct affections a syphilitic and an arthritic iritis. The former is only cured, he observes, by the cure of the lues, viz. by mercury; the latter, by the cure of the gout.

Cupping the temples is a mode of blood-letting in this disease which I have long preferred from observation of its effects, to the opening and ultimate division of the temporal artery. The invariable consequence of dividing a pulsating artery being to increase the impulse of the circulation in the collaterals, is certainly a reason why this mode of drawing blood should be followed by a less permanent benefit. My very intelligent friend Mr. George Young stated to me that he had several times observed arteriotomy to be followed by an aggravation of the ophthalmia, and he offered this argument in explanation of the fact.

Its opposite
effects, how
reconciled.

To those who have observed the unquestionable tendency of patients to this disease during and subsequent to the use of mercury, its double character of bane and antidote must appear a paradox; but considering the opposite conditions, both of the system and the part, in health and in disease, I think the seeming contradiction ceases. I see no difficulty in understanding how the sound iris should become inflamed and its vessels throw out lymph—and on the other hand, the vessels of the inflamed iris recover their healthy action, and the lymph become absorbed, under the operation of the same agent. A sound part presents at least as marked a distinction to a part diseased, as the opposite states of diseased parts present to each other. Yet we see deposition and absorption going on at one and the same time in different parts of the same system, healthfully if according to their respective need; the reverse, if otherwise; even sound parts, not to

speak of morbid depositions, reduced by absorption and deep ulcers filling with granulation—nay, who has not seen one ulcer cicatrizing, and another sloughing, on the penis or pudendum of the same individual? The effects of local applications place this fact in a more striking point of view. We inject a transparent ulcer upon the cornea with a solution of caustic; lymph is thrown out, and it heals. We inject the cornea rendered opaque by a redundant deposition of lymph, with the same solution; the lymph is absorbed, and it becomes clear. Now in either of these cases a contrary effect would be produced, if the remedy were resorted to at an improper time—viz.: the ulcer would increase, and the opacity become more dense.

But there is another, and perhaps more consistent explanation of these phenomena, since it does not require that the remedy should possess opposite modes of action. It is this: the changes which parts undergo in the commencement of the healing process, are not in fact opposed and dissimilar, as the conditions of the parts appear to be.

The absorbents, for example, are set to work to level the thick, abrupt, callous edges of ulcers, and thus to prepare or put them in a state for healing. This, it will be admitted, is as obvious an effect of mercury as the absorption of simple depositions without læsion. The granulation from the bed of the ulcer is an after process—an action of healing which follows as a natural effect of the salutary change which has taken place in the circumference. Thus, the filling up of the breach is an act of the constitution,

and may be regarded as the *remote*, not the direct consequence of the stimulus of mercury.

For myself, however, I do not consider the alterative action of mercury to be limited to one order of vessels.

The two cases which I subjoin are among the most remarkable of those which led me to the opinion, that the disease induced by mercury is afterwards cured by it.

CASE.

Case of iritis following three courses of mercury; after an interval cured by it.

Mr. —, a barrister, applied to an eminent surgeon on the 20th May, 1815, for a swelling in one of his groins, for which a liniment was prescribed. He was assured it was not venereal.

30.—An excoriation upon the prepuce of doubtful appearance. Entered upon a course of mercury, which was continued for five weeks. The excoriation was healed in two days.

July 19.—The swelling having suppurated and broke after a trifling discharge, healed. Began the bark.

Aug. 21.—Throat became sore, and a small rash appeared on the skin. A second course of mercury was begun upon, aided by the warm bath. The rash in a few days had disappeared. The patient complained of great pains in the legs, with much general debility.

Sept. 23.—Throat continued sore, but was not now considered venereal. Mercury was discontinued. To take sarsaparilla, with carbonate of soda.

Oct. 7.—Consultation. The surgeon now called

in, a practitioner of the highest reputation, at once expressed his decided opinion that the case was not venereal, and recommended the sarsaparilla and soda to be continued, with the addition of a gargle of rose honey and infusion, with alum and tincture of myrrh.

10.—The compound ipecacuanha powder ordered, and a bread and milk poultice to the throat.

14.—Throat becoming daily worse, a third course of mercury was commenced under the direction of the surgeon first consulted, and a sublimate gargle. Persevered in this course for six weeks.

November 30.—Began to take decoction of sarsaparilla with small doses of tartar emetic.

December 11.—Eyes inflamed. A collyrium of sublimate and lime water.

27.—Consultation with an eminent physician.—Bark decoction with extract. conii and pil. submur. hydrargyri.

Jan. 3, 1816.—Sight of right eye began to clear; left deprived of vision. Two drops of the vin. opii to be instilled into the left eye at night. Leeches to the temples; blisters behind the ears.

21st.—The extr. conii gradually increased in quantity. Bark discontinued. Pulse this day 130. Bad cough and incessant spitting.

February 5th.—The muriatic acid has been exhibited with some advantage. Left eye continues quite dark. Leeches directed to be applied to the eyelids. All medicine discontinued.

At this juncture I was consulted. The throat was affected with a diffused redness, and the

velum palati covered by a thin crust or coating of lymph, roughening the surface. Patient had great difficulty in shewing the throat, which was irritable on exposure to the air, and was almost unable to swallow. Left eye disorganized: the anterior chamber obliterated by coadhesion of the iris and cornea. Right eye in a very advanced stage of internal inflammation, verging on disorganization. Iris furred with lymph; no motion of the pupil; conjunctiva crowded with vessels of a purple colour; vision greatly obscured. Patient very weak and irritable, has a rapid and thready pulse, and perspires copiously.

8th.—I advised immediate recourse to mercury. This was stoutly resisted by the physician and surgeon in attendance, on the ground that the patient's complaints were all referrible to this medicine. My opinion of its necessity was not shaken, but it was agreed to wait a few days. The muriatic acid prescribed, and a fomentation of poppy.

13th.—The right eye considerably worse. Patient almost blind. My advice was now followed. R Hydr. \bar{c} cretâ gr. v : submur. hydr. gr. $\frac{1}{2}$ M. f. p. bis die sumend. Leeches to be repeated. An issue to be set in the nape of the neck and to be kept discharging.

20th.—Mouth has become slightly sore in less than a week. Inflammation greatly reduced; vision returned and gradually improving.

28th.—The eye having rapidly recovered, the mercury was discontinued. The extr. sarsap. with the decoction was ordered to be taken freely.

30th March.—Throat well. Health greatly re-established. Appetite daily returning. Sleep undisturbed. Patient gaining flesh.

August 1817.—I lately saw this gentleman, who has had no relapse. The right eye and its functions are perfect, and he is in full health.

CASE.

S. C. æt. 24, a young woman of respectable appearance and connections, was the subject of severe pain, affecting the forepart of the head and left temple; pains in the calves of her legs accompanied with cramp, and generally disordered health, which she attributed to a neglected cold. After much unavailing treatment directed to relieve the pains in the head, she was compelled to quit service, and in the month of December to come into the hospital. Here she was put upon a course of blue pill, and leeches were applied to the temple twice a week. Her gums were at this time a little tender, and she complained of tasting the pill, but ptyalism was never induced, although she continued to take the pill three times a day without intermission for three months. On her admission the right eye was slightly inflamed, but it soon recovered. Two months after her admission she took a severe cold by sleeping under an open window, and the consequence was an inflammation of the right eye. This was also superficial, being removed by a single application of leeches to the temple. She quitted the hospital greatly relieved of her pains, but not cured.

Case of iritis, following the continued use of mercury, and afterwards cured by it.

In about six weeks afterwards, she again

took a severe cold, which was followed by enlarged tonsil and sublingual glands, sore throat, and a fresh inflammation of the right eye; a rising also appeared upon the tibia of the right leg, a little below the tubercle, which was painful, but the skin not discoloured.

She applied to me a fortnight after this time, for an advanced inflammation of the interior tunics of the eye. The pupil was contracted, irregular, and a very large mass of brown lymph covered the semi-diameter of the iris next the temple, projecting so as to occupy more than one third of the aqueous chamber. The cornea and humors were hazy. The sclerotic conjunctiva had a leaden colour, and the eye-ball appeared to have lost its spheroidal shape, as if from interstitial absorption of the vitreous humor. She suffered severe hemicrania on the same side; her strength was greatly impaired, and with the affected eye she had scarcely any vision. I took her into the hospital, and after freely bleeding the temple and eyelids by cupping and leeches, prescribed the calomel and opium pill;—it disagreed with her bowels; the sublimate was given in frequent doses; and the ext. hyoscyami night and morning. The mouth soon became slightly sore, and the inflammation gradually subsided. The lymph was rapidly absorbed, the sight daily became clearer under the use of the belladonna. The swelling on the tibia had now become larger and acutely painful, and as it had evidently suppurated, I directed it to be laid open, which operation was followed by an attack of hysteria.

October 1.—The eye and vision are surprisingly restored, the pupil clear and much improved by the belladonna. Her health is also materially better, but the leg is affected with a diffused inflammation, of an erysipelatous character, accompanied with much tumefaction and tension, indicating the presence of a collection of matter beneath the periosteum, which her timidity would not permit to be divided. This young woman assured me, in a manner that I could not reconcile with the belief that she uttered a falsehood, that she had never known an individual of the other sex. It was evident that her feelings were deeply wounded by the suspicion.

[*Second Edition.*—March 1st, 1818. The subject of this observation has been confined by ill health with little intermission since the last report. Her chief complaint has been a chronic inflammatory affection of the liver, accompanied with great disorder and irregularity of bowels. The periosteal inflammation was succeeded by a most unhealthy and intractable ulcer, often acutely painful, and invariably fluctuating with the state of her digestive system. The eye has continued sound.]

How are these and similar cases to be explained, but by supposing the medicine, now salutary, to have been formerly deleterious? And this may be admitted. Of mercury, as a remedy, it may truly be said, ‘*nisi paret, imperat.*’ We see daily examples of its mischievous effects; and we refer them either to the quantity exhibited, the form employed, or the precautions neglected;

without always sufficiently regarding the texture of the part inflamed, the character of the inflammation, and the actual state of the constitution*.

But whether the action of mercury, by rousing the absorbent vessels, serves as a vehicle to the morbid poison, and modifies its effects on the system—or whether this be a simple inflammation excited by mercury, as we observe fever to be—or an inflammation peculiar to a cachexia, which its use has engendered, the fact that the disease yields to its discreet exhibition cannot be controverted. Nor is its efficacy less in cases to which no suspicion of syphilis or mercury in the system can attach; for example, where the iritis is obviously an extension of unchecked superficial ophthalmia, a very frequent case; or where the affection is at first proper to the iris, the external inflammation being secondary and sympathetic. From the facts which I have stated, one or two inferences are deducible, too important to be overlooked.

Modus
operandi of
mercury.

1st. The view, which, in the cases of iritis, we are enabled to take of the operation of mercury upon a part undergoing the adhesive inflammation, ought not to be confined to this case; it must be capable of extension and application to other organs in a similar condition. It affords demonstration the most palpable of its power to alter the action of the extreme vessels, which are the instruments of morbid changes in

* See Observations on Phymosis in another part of this volume.

all organs of the body. Its effect on membranes generally, especially the skin, is another proof of this. Its action on parts disposed to adhesive inflammation, as the serous membranes, is more marked than upon those which tend to the suppurative action, as the mucous. But for the gonorrhœa, in the army and on the continent, the sublimate is still generally employed, and often with success.

The effect of mercury as an application, is to excite a brisker action of the *vascula minima*, and thus it stimulates indolent and ill conditioned ulcers to assume a new and florid granulating surface, and a healthy secretion.

Upon a tumor, whether solid or fluid, the indirect effect of this remedy is to promote its removal by stimulating the absorbents of the neighbouring part. The brisker action of the extreme arteries induces a corresponding activity of the absorbents, for in proportion as the exhalants are unloaded, it is well known that the avidity of the absorbents is increased. It is common to see people grow fat after a course of mercury.

The effect of mercury to excite a new and peculiar action in the capillary system, is as marked upon the constitution as upon the part. It first quickens the heart and pulsating arteries, and is a stimulus in this stage which enfeebled habits but ill support. When it has entered the system, the febrile irritability is allayed, and a general tranquillity prevails, for all the secretions of the body are manifestly increased, the biliary and cutaneous especially. The absorb-

ent vessels are next reciprocally excited to increased activity ; and where its effect is salutary, it is at this time that the patient experiences a relief as from a burthen, a return of appetite and digestive power, and a lithesomeness almost conveying a sense of renovation.

Not specifically anti-syphilitic.

2d. Without further urging the inquiry, whether mercury ever induces or is concerned in inducing the inflammation which it unquestionably cures, the fact that it acts with equal rapidity and effect upon all cases of inflamed iris, whatever their origin, seems to me to shew that the idea of a specific anti-syphilitic virtue is an erroneous one. It arrests the inflammation produced by the absorption and secretion of a poison, as it arrests inflammations which have no such origin ; and the after effects are, in both cases, attributable to the stimulus, which, having entered the blood, it communicates to the extreme vessels. The fætor of the breath and the discolouration of silver applied to the surface, shews that it actually permeates the minutest orders of vessels, and the phenomena of its operation appear to me to depend essentially upon the change which it produces in their action.

The following interesting communication was addressed to me by my valued friend Dr. Farre, after a perusal, at my request, of the foregoing paper ; and knowing the esteem in which his opinions are deservedly held, I gladly avail myself of his permission to present it to the public:—

Dear Travers,

I am glad to travel a part of the way with you as a former colleague, for whom I entertain so high a regard.

We are mainly indebted to John Hunter for directing our attention to the action of the capillary arteries, a knowledge essential to medicine and surgery, considered as a science. To be able to present to the mind the actual condition of the capillary arteries of an inflamed organ, and the changes which are taking place at their extremities, is to know the disease ; and to be able to alter, to regulate, and to controul that action by remedies, is to cure it. Whilst the principal tendency of that series of remedies, which we comprise under the received term, antiphlogistic, from general blood-letting downwards, is to diminish the force of the heart and arteries ; it is in a peculiar manner the operation of mercury on the whole capillary arterial system to change its action, but not indefinitely. The gentlest action of mercury is to correct and restore the secretions proper to the alimentary canal to their natural condition, and, as by a charm, to dissolve the functional disorder of distant organs sympathizing with the first passages. This is an operation which so exactly accords with the intention of nature, that no morbid actions ought to result from the remedy itself when thus used. But it is quite another thing when it is necessary to arrest organic disease. The remedy itself produces a train of morbid actions. Not to dwell on what is well known, suffer me to direct your attention to the condition of the

extreme arteries when fully excited by mercury. It is an erythema—an action which essentially weakens the cohesion of parts : but the adhesive inflammation is so exactly opposed to this, that both cannot be the result of mercurial action. From the moment that I commenced the study of morbid anatomy, I directed my attention to the adhesive inflammation, because it opened to my view the most usual process of disorganization in the viscera.

This is not the place to enter into the progress of my research respecting this important fact, or to shew that I applied the practice to the chief organs of the body before the interesting changes on the iris particularly engaged my attention. Suffice it to say, that I had been led, from repeated observation of the adhesive inflammation of various textures being cured by the mercurial action, to receive it as one of the *general laws* of its operation to change that arterial action on which the effusion of coagulable lymph depends, and consequently to arrest all the subsequent changes which flow from this process. Doubtless, there are exceptions to this general law. The class of tumors properly so called, form an immense and lamentable exception to it ; and scrofula, in the same proportion that it has impaired the restorative powers of the constitution, forms another not less considerable. The extent and duration of the adhesive inflammation itself forms a third ; for all reasonable expectation of success, even from the use of the most powerful remedy, is founded on, and pre-supposes a struc-

ture perfect enough to effect the salutary changes; but it is the actual organization of the part which suffers by the continuance of this process, and thus unfits it to effect them; I take this to have been the reason of the failure of mercury in the case of Chapman, described and illustrated by figures in "Saunders on the Diseases of the Eye." The following is a parallel case as to the failure of the remedy, although not as to the cause of that failure:—

In September, 1816, a very delicate female, aged 25, suffered an unusually severe and obstinate attack of pleuritis. The disease yielded only to repeated, general, and topical bleeding, and to the frequent application of blisters; but the function of respiration was not set perfectly free till January, 1817, when the pericranium of the right side of the head became exquisitely painful. Various remedies, both external and internal, were tried without producing any permanent benefit till the month of May, when a gentle but regular course of mercury, which she had previously resisted from her aversion to it, was commenced. About the middle of the month, before any mercurial action was apparent from the use of the blue pill, she complained of pains of the left tibia, and a node appeared just below its head, the tonsils became deeply ulcerated in several places, and her face, body, and extremities, were pretty extensively covered with a copper-coloured eruption. Her husband was now questioned, and acknowledged, that he had been diseased, and that he had also infected her in the month of July, 1816; that it

was considered to be only a gonorrhœa, yet that his surgeon kept him two months under a mercurial course, during which his mouth was sore ; that he had never had any secondary symptom ; that his wife also submitted to a mercurial course, but so very partially, that her mouth was never made sore. As soon as those facts were stated, she was directed to rub in daily one drachm of the strong mercurial ointment, and in four days she was excessively salivated, and the function of the heart was so exceedingly disturbed, that it became essential to omit the use of mercury. The sores, however, on the tonsils, healed, the eruption faded and disappeared, the node on the tibia was absorbed, and the pains of the head subsided. As the mercurial action declined, which it did during a fortnight, the pupil of the right eye dilated, and the vision became impaired. Leeches were applied to the palpebræ, and a blister to the right temple. The soreness of the mouth and throat disappeared rather suddenly, and the right eye immediately inflamed ; lymph was deposited on the iris, and became organized. Whilst I was compelled to wait till she had power to bear the repetition of the mercurial action, the iritis advanced, and the eye became amaurotic ; for ordinary means had no influence here. As it was now certain that disorganization would take place if mercury were not administered, its action was again risked. The second course was commenced early in June, by rubbing in one drachm of the strong mercurial ointment daily. Her mouth was but slightly affected at the end of seven-

teen days, when she fell into so violent and obstinate a mercurial colic, with tenesmus and uterine irritation ; her heart palpitated so much, the arterial action was so feeble, and her emaciation so considerable, that I was compelled to withdraw the influence of the only means of saving the eye, hoping, at least, that the tranquillity of the organ was secured ; for the iritis was nearly subdued, and there was some manifestation of returning sensibility of the retina ; but at the end of a fortnight, when the mercurial action had subsided, the inflammation of the internal tunics of the eye returned with an extent and duration of suffering which has rarely been exceeded. Now the disorganization was progressive, the anterior and posterior chambers were filled with lymph, and all sensibility of the retina was lost. In one week from the re-commencement of the inflammation, the disorganization of the eye was completed. From the general appearance of the sclerotic coat, and a distinct pointing at one part of it, joined to the excess of coagulable lymph in the anterior chamber, it seemed to me, that, contrary to my former experience, the iritis had terminated in suppuration. The sufferings of the patient were so great, that, on a consultation with Mr. Lawrence, an incision was made into the posterior chamber by that gentleman. No discharge of pus attended the operation ; and this case confirms the opinion, that iritis terminates in the adhesive stage. In this respect it precisely corresponds with Fig. 3. Plate 1. in the work above cited, representing an eye disorganized by

syphilitic inflammation of the iris, on which you performed the same operation. In that case the eye became tranquil ; but in this the sufferings of the patient were only aggravated by the operation. The inflammation of the internal tunics continued unabated for two months, in spite of every palliative that could be used. Even opium, the refuge of the miserable under incurable disease, failed, after a time, to mitigate her sufferings. The morbid action gradually spent itself, and the remnant of the eye has been tranquil for the last month.

Is iritis an example of pure adhesive inflammation?—I consider that it is ; for if the case be left to nature, this is its tendency and termination.

Is the mercurial action an erythema or an adhesive inflammation of those parts on which it falls?—If the former, which I believe it to be, no two actions can be more opposed.

Are sloughing ulcers cured or aggravated by the mercurial action in which the establishment of adhesive or phlegmonous inflammation is essential to the preservation of the part? Accept an example or two. Mr. B. was under mercurial action for a chancre on the glans penis ; an erythematous inflammation surrounded the ulcer, and the part sloughed ; contiguous portions of the glans died successively. As soon as this destructive inflammation was set up, the further use of mercury was suspended, and two ounces of the powder of the best Peruvian bark was given daily. The granulating process was

established before the whole of the glans was lost. You know that mercury would never have occasioned the deposition of lymph, nor the organization of that lymph, so as to heal by granulation in this alarming case. A child was brought to me with one eye lost by slough, and the other inflamed, with nothing remarkable in its appearance except a small opaque yellowish spot on the cornea. A mild antiphlogistic treatment was prescribed; but just before the patient was dismissed, the mother told me that the child had some sores about the pudendum and nates. On examination several small ulcers appeared, all of which were in a sloughing condition. This served me as a key to the condition of the capillary arteries. The extract of bark was freely given. In eight and forty hours every ulcer on the body had a clean surface. The ophthalmia declined, and the eye was saved. Need I ask you what would have been the effect of the mercurial action in this case?

I have uniformly regarded the mercurial action as one of the most effectual means of arresting the disorganizing process of adhesive inflammation, whether of the iris or of any other texture of the body. To the liver in this state of disease, (hepatitis) it has been long applied, except that some have had their fears about commencing it too early; and through this delay have probably lost the opportunity of preventing suppuration. In cynanche trachealis it has been more recently used with success. In the last stage of marasmus, from nodes of the large bones, I applied it with success in 1805, and

since that period, with equal success, to adhesive inflammation of the pericranium, both where it has been entitled, pseudo-syphilitic, and where it was neither syphilitic nor bearing any resemblance to syphilis ; before and since that period with marked advantage, in arterial congestion, and even in organic changes of the brain ; in 1809 successfully in carditis from acute rheumatism, and since that period, in chronic carditis.

Believe me, dear Travers,

Yours, with sincere regard,

J. R. FARRE.

Charterhouse Square,

November 8, 1817.

Whether the mercurial action is always restricted to the state denominated erythema, and never advances to the adhesive stage of inflammation, is a point which I cannot take upon myself to decide. The facts which I have adduced seem to militate against this hypothesis, and a consideration of the case related by Dr. Farre, does not, I confess, induce me to alter my opinion that the iritis is frequently a direct consequence of the mercurial action. It appears that the eye was attacked with inflammation, for the first time, after an excessive salivation, by which all the syphilitic symptoms were permanently removed, and that lymph was deposited on the iris and became organized.

Since this paper was written, I attended an elderly lady, the subject of iritis of the right

eye, cutaneous eruptions, and rheumatic pains, which yielded readily to a very slight ptyalism.

Three weeks after the cure of the iritis, she was attacked with an inflammation, precisely resembling the former, in the left eye, and notwithstanding a slight paralytic affection of the right side, I persisted in the plan before pursued, diminishing the quantity of mercury one half, and at the same time exhibiting a light tonic; the inflammation yielded as speedily as before.

Whether sloughing sores are cured or aggravated by mercury, is an inquiry to which it is not difficult to reply, but which does not appear to me to be fairly connected with the question at issue. It will not be denied that ulcers often granulate even luxuriantly under the mercurial action. I have seen a rapidly destructive ulcer on the penis arrested by mercury, to which bark gave no check, but opium is a remedy on which I place more reliance in progressive sloughing.

The cutaneous erythema in some well marked cases which have fallen under my observation, has been produced by a very small quantity of mercury, and with such a state I have never seen the iritis combined, which on the contrary usually follows a larger or longer use of that mineral. It is a rare case, and is produced by opium, arsenic, and other substances as well as mercury.

I am quite aware, that the facts which I have stated in this paper admit of different conclusions. Some may incline to consider the iritis after mercury as casual, and not essentially de-

pending upon its use. Others may be unwilling to yield their belief of the presence of syphilis in the system, for which they will conclude that the remedy had been ineffectually administered. The subject is obscure, and an earnest desire to promote the investigation of it is perhaps the best apology I can offer for submitting it in so unfinished a state to the Profession.

The annexed paragraph shews, upon the highest continental authority, that the use of mercury in iritis was till of late but imperfectly understood.

“ If the surgeon has treated the ophthalmia according to the hitherto mentioned indications, and the same does not yield, or if none of these appear, then is he justified in resorting to *empirical* means. These are means, the efficacy of which, in obstinate inflammations of the eye, experience has proved ; but in the use of which the surgeon has often to *neglect indications and contra-indications*.——One of the most important remedies of this kind is mercury ; that potent remedy which has a particular, nearly a specific power in inflammations of various kinds, but particularly in inflammations of the eye. *Never is it useful as long as there is an indication for blood-letting. Are there impurities in the first passages, or after sufficient blood-letting, is the inflammation still vehement ? it may be given in such a form that it may operate as a purge. Is the eye very sensible, the body of the patient very irritable, or does the mercury excite*

too much diarrhœa, the mercury may be given with opium. Is the patient weak, the eye painless, relaxed, red, moist, or is the pain periodical, it is adviseable to give it with bark. (Warner on the Eye.)—The opium is one of the most powerful means. It is best given in connection with mercury, at morning and evening a bolus of one or two grains of calomel and half or a whole grain of opium.”

Richter's Anfangsgründe der Wundarzneykunst, Band 3, § 73.

The following is an extract from the very valuable and interesting observations of Mr. Rose on the treatment of syphilis without mercury, published since the first edition of this work, in the Medico-Chirurgical Transactions, vol. viii. part 2.

“ The good effects of that medicine (mercury) cannot be more beautifully illustrated than in this disease. The deposition and organization of lymph is so rapid, that before the cure was effected by other means, (which it probably always might be,) the powers of vision would often be permanently impaired. This is confirmed by the numerous cases of closed pupil and of opaque capsule, which are met with from the neglect of the disease.

To prevent any risk of this nature, I had recourse to a little mercury, whenever inflammation of the internal tunics of the eye was decidedly established. In several cases, along with different eruptions, there appeared a tendency to it, but it was checked by antiphlogistic remedies, except in the two last, before any lymph was ef-

fused; and in these the quantity of calomel which was given, could not be supposed to have produced a permanent cure, if they had been really venereal. This they probably were not. The sores in the last case were quite superficial, and the account of the primary symptoms in the other, was very confused."

Fig. 1.

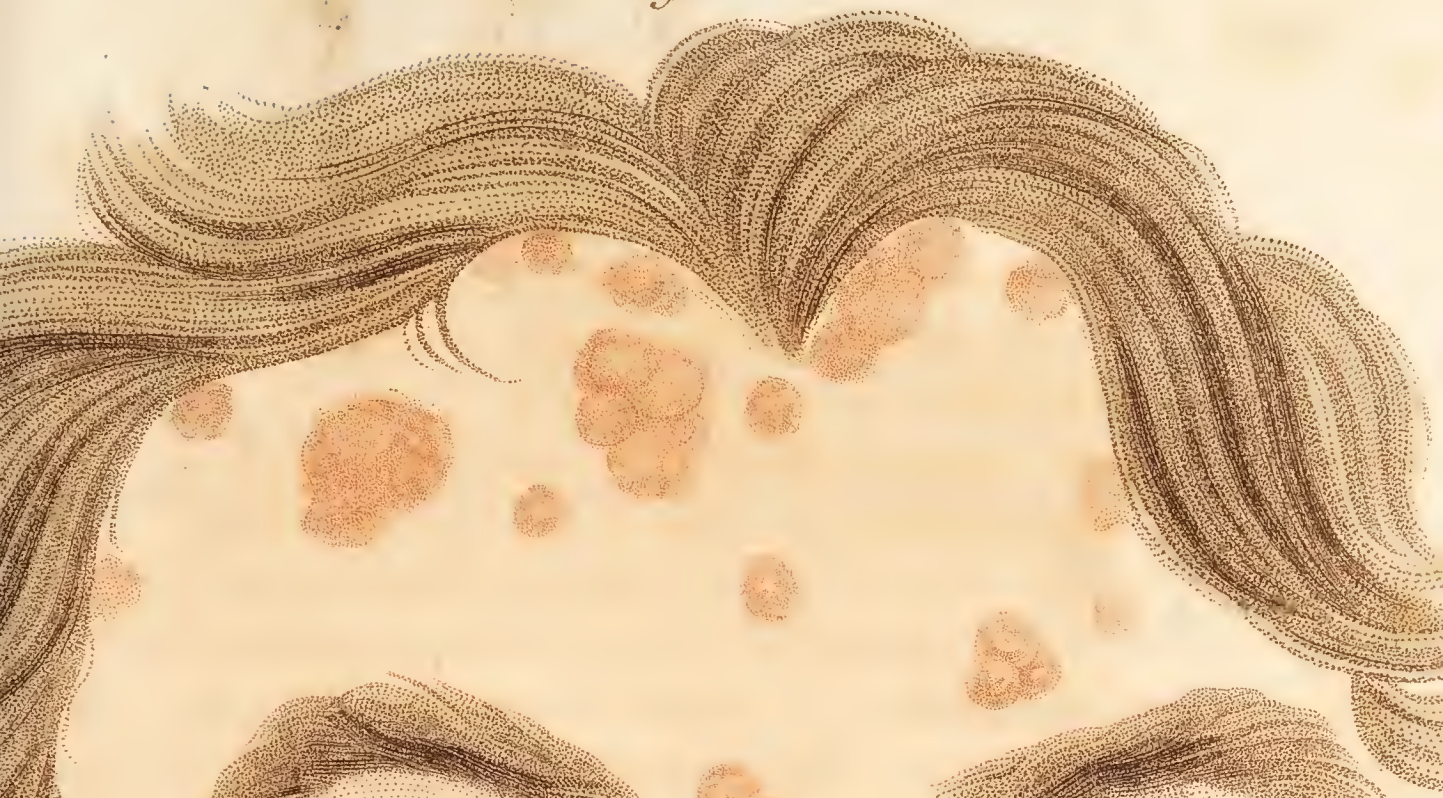


Fig. 4.



Fig. 2.

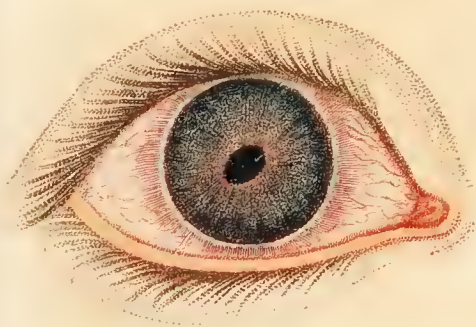


Fig. 3.

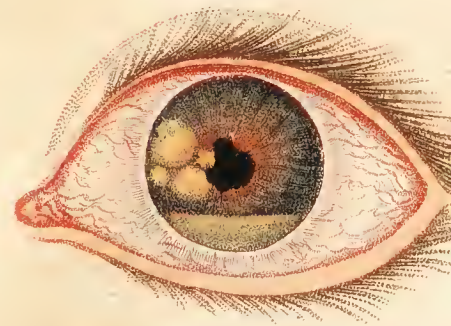


PLATE VI*.

Different appearances of Iritis.

Fig. 1. Represents the eyes of a woman who was the subject of eruptions and joint pains, and who had been long under the irregular action of mercury. The disease as here depicted is chronic, the violence of the inflammation has passed away, the pupillary portion is in either eye loaded with masses of lymph, which are in a degree organized; the figure of the pupil is lost, and the vision is greatly impaired. Under the continued gentle action of mercury, the deposit was nevertheless so far absorbed as nearly to restore the shapeliness of the pupil, though it remained permanently fixed, and the vision was considerably restored. The circumscribed tubercular eruption seen on the forehead was thinly scattered over the arms and other parts of the body.

Fig. 2. Is an idiopathic iritis not allied to syphilis, and wholly independent of the mercurial action. The zone is strongly marked, the pupil contracted and misshapen, but without any external appearance of lymph.

Fig. 3. Is a secondary iritis. The onyx is of pus as its figure demonstrates, and is derived

* I have endeavoured to render this Plate more accurate than that of the former edition, which I regret to say, was much otherwise.

PLATE VI.

from an interstitial ulcer of the cornea, which had opened into the anterior chamber. This does not admit of graphical delineation. The internal ulcer of the cornea is in my observation the only source of purulent onyx or hypopion. The iris becoming inflamed preserves its proper mode of inflammation, *viz.* the adhesive. The inflamed iris does not secrete pus, nor does it take on the ulcerative action.

Fig. 4. Acute iritis during the use of mercury for secondary syphilis, and accompanied by doubtful or at least mixed symptoms.

CASE OF LIGATURE

ON THE

AORTA.

BY

MR. ASTLEY COOPER.

I FEAR that the title of this paper may impress the reader with an idea that nothing could justify me in performing the operation which I am about to describe ; for that a ligature made upon the aorta must necessarily prove fatal. But I trust, that it will be seen in the sequel, that the operation was not attended with the immediate danger which might have been apprehended, that the patient complained of but little pain during its performance, that it afforded the only hope of safety, and that we had to lament, not that the operation was performed, but that it had not been sooner done.

Operation
not attend-
ed with im-
mediate
danger.

Sorry indeed should I be, to sport with the life of a fellow-creature who might repose a confidence either in my surgical knowledge or in my humanity ; and I should be equally disposed to consider myself culpable, if I did not make every possible effort to save a person, whose death was rendered inevitable, if a disease were suffered to continue which it was possible for surgery to relieve, as in the case which forms the subject of this essay. In the performance of our duty one feeling should di-

rect us ; the case we should consider as our own, and we should ask ourselves, whether, placed under similar circumstances, we should choose to submit to the pain and danger we are about to inflict. Guided by this principle, and having collected all the evidence which applies to the case, we perform our duty without the reproaches of conscience which must await those who unnecessarily subject their patients to pain and danger.

First operation for carotid aneurism unfortunate; second successful.

Those who feel disposed to condemn the attempt which I have here described, will have the kindness to recollect, that although my first operation for carotid aneurism proved equally unfortunate with this, yet in the second operation, I was gratified by the successful issue of the case.

Three sources of medical evidence.

In collecting evidence upon any medical subject, there are but three sources from which we can hope to obtain it ; *viz.* from observation on the living subject ; from examination of the dead ; and from experiments upon living animals. By the first, we learn the history of disease ; by the second, its real nature, so far as it can be certainly known ; and by experiments upon living animals, we ascertain the processes resorted to by nature for restoring parts which have sustained injuries, and then apply that knowledge to accidents in man.

General considerations on ligatures of arteries ;

in the larger cavities ;

In applying ligatures upon the arteries generally, the chief circumstance to be considered is, the probability of the blood being conveyed by means of anastomosis to the parts beyond ; but in operations upon those arteries, which are seated in the larger cavities of the body, it be-

comes a subject of consideration, by what mode the ligature shall be prevented from occasioning destruction. In common parts, it produces sup-
in common parts;
 puration and ulceration, which end in the separation of the ligature; but amidst the vital or-
amidst vital organs.
 gans, a suppurative process may endanger life.

The Aorta is so rarely obstructed, that the
Aorta rarely obstructed.
 opportunity of ascertaining the power of anas-
 tomosing vessels in propelling the blood is ex-
 tremely unfrequent. The first impression arising
 from examination of the structure of the aorta at
 its curvature would be, that an anastomosis
Obstruction at the curvature.
 would not be sufficiently free to permit the blood
 to find its course by circuitous channels; and
 the only opportunity that I have had of seeing
 a contracted aorta in the human subject would
 serve to confirm that opinion: but Mr. Graham
 has met with a case (which will hereafter be de-
 tailed) which shews that even in that part of the
 aorta, the communication may be sufficient to
 allow a passage to the blood.

With respect to the case of contracted aorta,
 which I had the opportunity of seeing, the fol-
 lowing are the particulars, as given to me by Mr.
 Winstone, Surgeon, of Charter-house Square,
 who solicited me to inspect the dead body:—

“The gentleman, who formed the subject of
Mr. Winstone's case.
 it, was 57 years of age, of a full habit, accus-
 tomed to free living, had been in good health for
 years, excepting in the winter, when he was
 always troubled with a violent cough; more
 violent than I ever witnessed in any other per-
 son. In the night of April the 7th, 1809, he was
 affected with cough and difficulty of breathing

to a greater degree than usual ; and at five in the morning I saw him. He complained of pain under the sternum, the extremities were cold, the countenance exhibited marks of inexpressible anxiety; the pulse was rather weak, but regular, and much altered in frequency. These symptoms continued with but little alteration, notwithstanding cupping on the sternum, blistering and volatile medicines, until about eleven o'clock, when he was prevailed upon to go to bed. He walked up stairs, and fell on the bed lifeless."

Dissection.

Upon our opening the body, the pericardium immediately presented itself exceedingly distended; and on making an incision into it, a large quantity of blood was discharged; upon examination of the heart, one of the coronary veins was found ruptured on the anterior surface of the right ventricle. At first I supposed this was the source of the blood found in the pericardium; but upon more minute examination of the heart, when I had brought it to my house, I found an opening leading into the right ventricle, and that the rupture had begun in this part of the heart and extended through its substance, bursting the vein in its progress. I opened the pulmonary artery, but found it free from disease; the left side of the heart was also healthy, but the lungs adhered in some degree to the inner side of the chest, and a small quantity of fluid was found in each remaining portion of the cavity of the thorax. The finger being thrust into the aorta, opposite to that part at which the *canalis arteriosus* terminates, a stricture was dis-

Rupture of
the right
ventricle of
the heart.

Adhesion of
the lungs.

covered in it, which with difficulty admitted the little finger, and which, on more particular examination, was found to be a thickening of the circular fibrous structure of the vessel, accompanied with some ossification of its coats. This state of contraction in the aorta impeded the passage of the blood through the heart and lungs, and under the extreme degree of distention thus produced, the right ventricle, from its less power of resistance, gave way, and occasioned the sudden termination of the patient's existence.

Stricture in
the aorta.

The following case has been published in the Medico-Chirurgical Transactions, by Mr. Graham, Physician to the Infirmary, Glasgow.—
(Vide Medico-Chirurgical Transactions, Vol.V.)

“ The case which I take the liberty of transmitting to the Medical and Chirurgical Society, has, as far as I know, but one parallel on record; and in it the appearances on dissection only are mentioned; no history is given of the case. I believe, I have extracted from the books of the infirmary, such parts of the reports taken at the patient's bed-side as are of any importance, and have noted some anomalous symptoms which may now appear trifling; because it may perhaps be found that an improved state of knowledge may give importance to what at present seems adventitious, and without value. I am sorry to say, that as I can see no diagnostic symptom, the occurrence of this derangement adds but another chance to our guessing wrong during life, at the diseases of the heart.

Mr. Gra-
ham's case.

“ Henry Frere, 14 years of age, a weaver, admitted into the infirmary the 3d of August, 1813, where the following history of his symptoms was entered on the journal of the house:—

Symptoms.

“ Two weeks ago, after exposure to cold, was affected with dry cough, which, for the last eight days has been attended with tolerable copious expectoration and pain, impeding respiration, and excited by the cough, in the left side of the chest; pulse 100, somewhat firm; little appetite; much thirst; tongue rather white; bowels regular; sleeps ill; sweats considerably; has used no medicines.”

Supposed to be pneumonia in an advanced stage.

The disease was regarded as a case of pneumonia, but of such standing, that suppuration seemed to have taken place, and in which, therefore, no material benefit was likely to result from any treatment. However, under the ordinary means, bleeding, blistering, expectorants, and the free use of cathartics, I had the satisfaction of seeing the symptoms decline. The blood from the first bleeding presented somewhat of the buff coat. The pulse, however, generally ranged from 92 to 104, and is variously marked in the reports; full, strong, sharp: it was always regular. The *sputum* became more copious, gross, and tinged with blood. He perspired chiefly from the upper parts of the body, moaned in his sleep, and took little food. On the 8th he was affected with nausea and vomiting. On the 19th he had a febrile attack, which lasted a few days. On the 20th there was much pain in the left eye-ball. On the 27th he complained only

Palpitation.

of palpitation—the first time that symptom is

noticed in the journal, though I rather think this was an oversight. No report was taken from this date till the 6th of October, when he was dismissed from the hospital "cured."

The palpitation had subsided as the strength increased; which encouraged a hope I was willing to entertain, that this symptom proceeded from weakness, though I could not but express fears that the inflammation had extended to the pericardium or the heart. The uncertainty of the diagnosis in cases of this kind, is but too well known to every practitioner. I was inclined to suspect the effusion of serum within the pericardium, or perhaps adhesion of the heart to its capsule, though I had seen at least two cases about that time of the most intimate and general adhesion, without the circulation having been in any degree affected.

Uncertain
diagnosis.

These fears were much strengthened by the boy's appearance on returning to the hospital on the 13th of November, when the throbbing of the carotid and subclavian arteries was very remarkable. On his re-admission, the following report appears on the journal:—

"13th November.—Dyspnœa, palpitation at the heart, and pain in the left side of the thorax returned soon after he left the house, and have been gradually increasing; pulse 88, regular; bowels kept open by physic; received temporary relief from the application of a blister."

Dyspnœa,
palpitation,
and pain of
the left side.

Blisters and cathartics were again employed, and the symptoms for a time declined. The pain, which had been removed, returned to the left side of the chest on the evening of the 29th. A blister was repeated next day, which gave

much pain, till he was suddenly seized with a febrile attack on the 2d of December, when the part became quite easy. There was no strangury. The fever was gone next day. A similar attack, accompanied with nausea and vomiting, was experienced on the 12th, and immediately removed by the operation of an emetic. He had acidity at the stomach, and cardialgia after meals. On the 23d, he is reported as having been affected for ten days with pain in the right side of the chest, increased by motion, and by full inspiration, accompanied by frequent cough, most troublesome in the night. The pulse had again risen; he was blistered, used cathartics, and was twice bled; the blood, especially after the first operation, being very buffy. The pulse subsided, and the pain was removed, but the cough and palpitation continued. The circulation was again quickened on the 27th, and remained hurried till his death; he sunk at length; was drenched in perspiration; took no food; was attacked with frequent vomiting; the urine became sandy; his sleep was disturbed; the dyspnoea and palpitations increased, and he expired about noon on the 2d of January. The pulse, while he was last in the hospital, fluctuated from 90 to 116, and was of various degrees of strength and firmness; latterly only, weak: it was always regular.

Dissection.

Serum in
the abdo-
men.

There was nearly a pound of serum in the cavity of the abdomen, and the bowels were distended with flatus, but the viscera seemed

natural. Immediately on turning up the sternum, the pericardium presented itself very much enlarged, obscuring the left lung, and adhering to the pleura costalis. This capsule, which was thin and beautifully transparent, contained about an ounce of fluid, and a heart nearly twice its natural size for a boy of this age. The arteries and trachea were distended above the arch of the aorta; the contents of the thorax were turned downwards; and the aorta, being divided below the whole, was removed from the body. The walls of the left ventricle were about an inch in thickness, but no other derangement in the structure of the heart or its valves, was observed. The capacity of the cavities seemed natural. The aorta expanded unusually near its origin, so as to form a kind of pouch, but after having given off the branches to the head and superior extremities, its diameter was preternaturally contracted. It was continued of this diminished size till after its union with the canalis arteriosus, where it was completely impervious. The coats were not thickened, or in any way diseased, except that about half an inch below the stricture, there was a smooth elevation on the inner surface, less raised, but having nearly the diameter of a split pea; otherwise the appearance was exactly such as if a ligature had been tied tightly round the artery. The obstruction was about a line in breadth. The artery then received three trunks about the size of crow quills, and near them three smaller ones, afterwards resuming its natural size along the vertebræ. These three trunks are evidently the uppermost of the infe-

Increased
size of the
heart.

Aorta ex-
panded
near its
origin.

Preterna-
tural con-
traction of
it.

Impervi-
ous.

Received
three
trunks im-
mediately
below the
stricture.

rior intercostals; their coats were remarkably thin, like those of veins. A probe passed from the pulmonary artery along the *canalis arteriosus* to the obstructed portion of the aorta; but from its thickened appearance, it did not seem probable much communication by means of it could have been allowed, and the florid countenance of the boy during life establishes the same conclusion. There having been no suspicion of this singular deviation from the natural structure till after the contents of the thorax were removed from the body, it was impossible to trace, with the accuracy that could be wished, the anastomosing branches by which the circulation had been carried on in the inferior parts of the body; but I think enough has been observed to lead us very near the truth. The *arteria innominata*, the left subclavian, the superior intercostals, and the mammary arteries, were much enlarged. The epigastric was reported to be of its natural size. These facts, and the aorta acquiring at least very nearly its natural size immediately below the stricture, shew that the blood did not pass to the inferior extremities, in any material quantity, as might perhaps have been expected, by the inosculations of the mammary and epigastric arteries, but chiefly by the communications of the superior intercostals and the mammary arteries with the three large branches entering the aorta below the stricture: also from the mammaries and thoracics through others of the intercostal and diaphragmatic arteries.

Circulation
carried on
by the su-
perior in-
tercostals
and mam-
maries.

The lungs were very light coloured; the left

lobe much collapsed. In each side of the thorax there was a small quantity of bloody serum."

After the aorta has formed its curvature, it gives off numerous intercostal arteries within the cavity of the chest; and though these vessels are small, they communicate so freely with each other, that under a gradual obliteration of the aorta, the blood would be still readily transmitted to the inferior parts of the body. An example of this kind is related by Mr. Paris, and is quoted by Mr. John Bell, in his Surgical Observations.

"Mr. Paris, Dissector of the Amphitheatre of the Hotel-Dieu, in the year 1789, injected the body of a very lean old woman, about 50 years of age, whose arterial system was found to be singularly deranged, and the circle of the blood changed altogether by a complete contraction of the aorta a little beyond the arch. Mr. Paris had his attention particularly excited to the condition of this subject by the unaccountable enlargement of the small arteries upon the fore part of the chest. He had filled the arteries with an injection composed of equal parts of suet and resin, coloured with lamp-black; and this injection, thrown in from the mouth of the aorta, passed along so easily, that far from suspecting an obliteration, he felt that he could have thrown in more injection than is usually required for filling an adult body.

Mr. Paris's case.

The subject was so meagre, that, without dissecting, Mr. Paris felt the thoracic arteries run-

Aorta contracted below the arch.

Arch very slightly dilated.

ning down the sides of the chest tortuous and remarkably enlarged. It was natural for him to be very careful in the dissection of this subject. He found the aorta immediately beyond its arch contracted to the size of a writing quill; the coats of the artery were of their usual thickness, and its cavity of course extremely small; the arch of the aorta above this contraction was but very slightly dilated; the part below had lost nothing of its natural size. Nothing could be found either in its own structure, or in the condition of the neighbouring parts, to account for this contraction of the artery.

The carotids were in the natural state; the arteria innominata, and the left subclavian were enlarged to twice their natural diameter; all their smaller branches were increased in the same proportion, and had assumed a curled and zigzag course: the internal mammary and phrenic arteries were greatly enlarged and very tortuous. The transverse arteries of the neck were of twice their natural size; the posterior branches were tortuous, extending to a great distance over the back, with long inosculations which were met from below by the branches of the upper intercostal arteries, and they were also remarkably enlarged; the thoracic and scapular arteries which run along the side of the chest, were twice their natural size.

Below the constricted part of the aorta, the lower intercostals were remarkably enlarged, even to three or four times their natural size; each of them was dilated, but those were most affected which were given off nearest the contracted part; and the posterior branch of each,

which penetrates to the muscles of the back, was more dilated than that which runs between the ribs : indeed, those posterior branches were so remarkably dilated with contortions so closely succeeding each other, that they resembled a necklace of beads ; and their inosculations with the branches of the *transversalis cervicis* were very remarkable. The lower phrenic artery was enlarged, forming considerable inosculations with the superior phrenic ; the epigastric artery was dilated to the size of the enlarged mammary, and was joined with it by very numerous and conspicuous inosculations !” This case clearly demonstrates, that the greater part of the blood, usually conveyed by means of the aorta through the thorax, is capable of finding a circuitous course by the branches of the subclavian and intercostal arteries.

Posterior
branches
more parti-
cularly di-
lated.

With respect to the aorta in the abdomen, I have met with no instance in the human subject of its obliteration or contraction ; but if such an event were to occur, little difficulty could arise in the transmission of blood by collateral channels : the mammary and epigastric, the superior and inferior mesenterics, and the lumbar arteries could furnish abundant opportunity for a circuitous course of the blood.

Although in the human subject we are thus deficient in evidence concerning a circuitous circulation in the cavity of the abdomen, yet with respect to other animals, it is probably generally known, that I have several times made

ligatures upon the aorta of the dog, and found that the blood was readily carried by anastomosing vessels to the posterior extremities of the animal. Of which experiments an account has been published in the *Medico-Chirurgical Transactions*.

Operation
of tying the
aorta in
dogs.

Dissection.

The incision was, in each experiment, made on the left side of the spine, the aorta was drawn to the surface of the skin by an aneurismal needle, and all the surrounding parts being separated from the vessel, so as to perfectly bare its coats, a ligature was applied around it. An animal under these circumstances was kept for a few weeks, and then killed : being injected and dissected, the lumbar arteries, which were considerably enlarged, were found to be the chief agents of the new circulation. We have a beautiful preparation in the collection at St. Thomas's Hospital, shewing the obliterated aorta, and the numerous and enlarged anastomosing vessels which carried on the circulation ; thus establishing, as far as analogy could go, the possibility of the blood being transmitted in a similar manner in the human subject.

I shall now proceed to detail the circumstances of the case which forms the principal object of this Paper, leaving the remarks upon the kind of ligature to be employed till a description of the operation has been given.

CASE.

Charles Hutson, a porter, aged 38 years, was admitted into Guy's Hospital, April 9, 1817, for a swelling in the left groin, situated partly

above, and partly below Poupart's ligament. An obscure pulsation could be perceived in it, and it was concluded to be an aneurism. The history which he gave of himself was, that thirteen months previous to his admission, he had fallen against the corner of a chest, by which accident he received a violent blow upon the left groin, and was so much hurt as to be unable to walk to his home. On the following day, his thigh became so much discoloured and swollen, that he could not rise from his bed.

Case concluded to be aneurism.

Received a violent blow on the left groin.

Thigh next day much swollen.

After a confinement of three weeks, he began to recover, and the limb soon returning to its natural size, he resumed his employment, but was never able to exert that limb with the same freedom as the other: however, he continued to work, though with the greatest difficulty, till within a fortnight of his admission into the hospital: for some time previous to which, he had been occasionally troubled with a pricking sensation in the limb, but it was only transient, and seemed to arise from the pressure of the tumefaction upon the anterior crural nerve. Some degree of swelling had remained in the groin from the time of the accident; and for some weeks previous to his admission, he had been obliged to loosen his clothes on the left side.

Complained of pricking sensation in the limb.

At this period the swelling was considerably diffused, several large veins crossed its surface, and pressure upon it gave considerable pain. On the third day after he had been in the hospital, the swelling increased to double its former size, and the pulsation became less distinct, excepting in the course of the iliac and

Swelling greatly diffused.

Extent of
swelling.

femoral arteries. The tumefaction extended from three to four inches above Poupart's ligament, to an equal distance below it, and was of great magnitude. Just below the anterior and superior spinous process of the ilium, a distinct fluctuation could be perceived in the aneurismal sac above Poupart's ligament, so that the blood had evidently not yet coagulated; and the peritoneum was carried far from the lower part of the abdomen, in such a manner as to reach the common iliac artery, and to render an operation impracticable without opening the cavity of the peritoneum. I therefore determined to avail myself of other means, or to wait the efforts of nature towards a spontaneous cure, before I performed any operation; a circumstance which it is well known every now and then occurs.

Fluctuation
perceived
above Pou-
part's liga-
ment.

Swelling
suddenly
increased.

May 16.—The swelling had suddenly increased; and the pulsation becoming more distinct, twelve ounces of blood were ordered to be taken from the arm.

Pressure
applied.

21.—Pressure was applied upon the fore part of the swelling, by means of a cushion bound down upon it by a broad roller; twelve ounces of blood being drawn from his arm, the patient declared himself to be more at ease.

27.—The pressure upon the tumor being removed, the skin was found abraded and discoloured, with the loss of its sensibility.

30.—In the morning he reported, that he had passed a restless night, and appeared to labour under considerable constitutional irritation. The swelling had very much increased; a tourniquet was ordered to be applied upon it, with di-

Tourniquet
ordered to
be applied.

rections to adjust it in such a manner as to press upon the aneurism, but as little as possible upon the surrounding parts.

June 1.—He had borne the pressure of the tourniquet tolerably well, but it made no difference in the size of the tumor.

4.—When the tourniquet was loosened, a slight ulceration of the skin over the sac was observed, and it was therefore ordered not to be re-applied. Slight ulceration from the tourniquet.

5.—He complained of the limb feeling so excessively heavy, that he had difficulty in raising it. The skin over the aneurism is shewing a disposition to slough. Limb excessively heavy.

19.—A slough was observed on the exterior part of the swelling below Poupart's ligament, which had nearly separated with a deep ulceration around it. Slough and ulceration.

20.—At ten in the morning he had a bleeding from the external part of the sac, but the loss of blood was not considerable. A compress of lint was applied, and confined by adhesive plaster. He had no return of bleeding on the following day. Slight hæmorrhage.

22.—At 7 o'clock in the morning, after some slight exertion, he bled again; but still the bleeding was not profuse.

24.—The bleeding again recurred, but stopped spontaneously.

25.—About half-past two o'clock in the afternoon, in consequence of a sudden mental agitation, he bled profusely. My apprentice, Mr. Key, fortunately succeeded in preventing his immediate dissolution by pressure, but the man was so much exhausted, that the fæces were passed involuntarily. Profuse hæmorrhage.
Involuntary passage of fæces.

In danger
of another
hæmor-
rhage,
which
would prove
fatal.

Small open-
ing made
into the
aneurism.

Finger in-
troduced.

At 9 o'clock the same evening I saw him, and found him in so reduced a state, that he could not survive another hæmorrhage, with which he was every moment threatened. Yet, still anxious to avoid opening the abdomen, to secure the aorta near to its bifurcation, I determined to ascertain whether it was practicable to pass a ligature around the artery from within the aneurismal sac ; for I was of opinion, that if the artery had given way near the centre of the sac, as it usually does in aneurism, I might compress it with my finger, and pass a thread around it. With this view, I made a small incision upon the aneurism, about two inches above Poupart's ligament ; and having made a very small opening into the sac, I passed my finger easily into it, and felt for the artery upon which it was formed ; in doing which, my finger so completely filled the opening, that it prevented the escape of any blood by its side. I moved the finger to feel for the artery, but found only a chaos of broken coagula, and that the artery entered the sac above and quitted it below, without there being any intervening portion of vessel ; and therefore, was constrained to abandon that mode of operation. When I was about to withdraw my finger, I directed two of the students to compress with their hands the aorta upon the spine, and they succeeded in stopping the pulsation in the artery of the right groin. As I withdrew my finger, I put a dossil of lint by its side, and closed the opening which I had made into the sac.

It is proper here to observe, that the aperture

made into the aneurism by the sloughing process, was situated too far from the natural seat of the artery, to allow a hope of my finger reaching it from thence. As I was quitting the patient's bed-side, I felt a great regret, in which all the students by whom I was surrounded joined me, that the patient should be left to perish without giving him the only chance which remained of preventing his immediate dissolution from hæmorrhage, by tying the aorta; and I therefore said, "Gentlemen, this only hope of safety I am determined to give him."

Artery
could not
be reached
from the
slough.

The operation was performed as follows: The patient's shoulders were slightly elevated by pillows, in order to relax, as much as possible, the abdominal muscles; for I expected that a protrusion of the intestines would produce embarrassment in the operation, and was greatly gratified to find that this was prevented by their empty state, in consequence of the involuntary evacuation of the fæces; and here let me remark that I should, in a similar operation, consider it absolutely necessary, previously to empty the bowels by active aperient medicines.

Operation.

Intestines
empty.

Caution.

I then made an incision three inches long into the linea alba, giving it a slight curve to avoid the umbilicus: one inch and a half was above, and the remainder below the navel, and the inclination of the incision was to the left side of the umbilicus in this form (\curvearrowright). Having divided the linea alba, I made a small aperture into the peritoneum, and introduced my finger into the abdomen; and then, with a probe-pointed bistoury, enlarged the opening into the peritoneum

Incision
made in the
linea alba.

Curve to
avoid the
umbilicus.

Opening of
the perito-
neum.

to nearly the same extent as that of the external wound. Neither the omentum nor intestines protruded; and during the progress of the operation, only one small convolution projected beyond the wound.

Finger
passed into
the abdo-
men.

Peritoneum
divided by
the finger
nail.

Having made a sufficient opening to admit my finger into the abdomen, I then passed it between the intestines to the spine, and felt the aorta greatly enlarged, and beating with excessive force. By means of my finger nail, I scratched through the peritoneum on the left side of the aorta, and then gently moving my finger from side to side, gradually passed it between the aorta and spine, and again penetrated the peritoneum on the right side of the aorta.

Ligature
passed
around the
aorta.

I had now my finger under the artery, and by its side, I conveyed the blunt aneurismal needle armed with a single ligature behind it; and my apprentice, Mr. Key, drew the ligature from the eye of the needle to the external wound; after which the needle was immediately withdrawn.

Exclusion
of the intes-
tine from
the liga-
ture.

The next circumstance, which required considerable care, was the exclusion of the intestine from the ligature, the ends of which were brought together at the wound, and the finger was carried down between them, so as to remove every portion of the intestine from between the threads: the ligature was then tied, and its ends were left hanging from the wound. The omentum was drawn behind the opening as far as the ligature would admit, so as to facilitate adhesion; and the edges of the wound were brought together by means of a quilled suture and adhesive plaster.

Wound
united by
quilled su-
ture, and
adhesive
plaster.

During the time of the operation, the fæces passed off involuntarily, and the patient's pulse, both immediately, and for an hour after the operation, was 144 in a minute; he was ordered thirty drops of tincture of opium and camphorated mixture, and the involuntary discharge of fæces soon after ceased. I applied my hand to his right thigh immediately after the operation, and he said that I touched his foot; so that the sensibility of that leg was very imperfect.

Involuntary discharge of fæces; pulse 144.

Imperfect sensibility of the limb.

For the following particulars I am indebted to Mr. William Cox, one of my apprentices.

At midnight his pulse was 132.

26.—At 1 o'clock in the morning, the patient complained of heat in the abdomen, but he felt no pain upon pressure; he said that his head felt hot, and that he had pain in the shoulders; his lower extremities, which were cold soon after the operation, were now regaining their heat; his body was in other parts covered with a cold sweat. The sensibility of the lower extremities has been very indistinct since the operation.

State at one in the morning.

At 2 o'clock he felt so comfortable from his medicine that he wished to have more of it, and ten drops of tincture of opium were given him; his legs were wrapped in flannel, bottles of hot water were applied to the feet, and he then said that the heat of his belly was lessened.

At 6 o'clock the sensibility of his limbs was still imperfect.

At 8 o'clock A.M. he expressed himself as feeling quite comfortable; he however passed

no urine, and had no evacuation ; his right limb was warmer than the left, and the sensibility was returning.

Difference
of tempera-
ture in the
two limbs.

At noon the temperature of the right limb was 94, that of the left or aneurismal limb $87\frac{1}{2}$.

At 1 o'clock, P.M. Mr. Cooper visited him, and as he walked up the ward he appeared much gratified at seeing his patient, who was at the point of death the evening before, and who was now adjusting his bed-clothes, and smiled as Mr. C. approached his bed.

At 3 o'clock after a fit of coughing, the man was much alarmed with the idea of the thread having slipped into the wound : it was a false alarm ; but, to prevent the idea of its recurrence, it was fastened to a quill : soon after this he complained of pain in the abdomen ; it was not very severe, nor did it last long ; readily yielding to fomentations. As he had no evacuations, he was ordered an enema.

Vomited.

At 6 o'clock, P. M. he vomited, soon after the glyster had been administered : the heat of the right leg was 96, and of the left or diseased limb $87\frac{1}{2}$.

At nine in the evening he took half a glass of port wine in warm water, which he immediately rejected : he complained of pain in the loins ; his pulse was 104 and feeble ; he was very restless, and had an involuntary discharge of fæces.

Eleven at night, his pulse 100 and weak ; he still vomited.

Vomiting
returning
at intervals.

27.—At 7 A. M. the report was, that he had passed a restless night ; the vomiting had returned at intervals ; his pulse 104, weak and

fluttering : he complained of pain all over his body, more particularly in his head ; and the carotids beat with considerable force ; he had great anxiety expressed in the countenance, was very restless, and the urine dribbled from him, with some degree of pain at the end of the penis.

Pain of the head ; increased action of the carotids.

At 8 o'clock, A.M. the aneurismal limb appeared livid and felt cold, more particularly around the aneurism, but the right leg remained warm.

Coldness and livid appearance of the affected limb.

At 11 o'clock his pulse was 120 and weak ; he appeared to be sinking. To the questions which were put to him he did not return any answer ; he appeared to have an uneasiness about the heart as he kept his hand upon the left breast.

He died at 18 minutes after one, P.M. having survived the operation 40 hours.

Died.

After being informed of his death, I requested Mr. Brooks of Blenheim Street to attend with me at the inspection of the body. Mr. Travers, surgeon of St. Thomas's Hospital, Mr. Stocker, apothecary of Guy's, and a large concourse of medical students attended the examination.

When the abdomen was opened, we found not the least appearance of peritoneal inflammation, excepting at the edges of the wound. The omentum and intestines were free from any unnatural colour ; the edges of the wound were glued together by adhesive inflammation, excepting at the part at which the ligature projected.

Dissection.

We were much gratified to find that the ligature had not included any portion either of the omentum or intestine : the thread had been passed

No portion of intestine included in the ligature.

Clot of
above an
inch closed
the vessel
above the
ligature.

Aneurismal
sac

Neck of the
femur frac-
tured.

Cause of
death.

around the aorta about $\frac{3}{4}$ of an inch above its bifurcation, and about an inch or rather more below the part at which the duodenum crossed the artery. Upon carefully cutting open the aorta, a clot of more than an inch in extent was found to have sealed the vessel above the ligature; below the bifurcation, another, an inch in extent, occupied the right iliac artery, and the left was sealed by a third which extended as far as the aneurism; all were gratified to observe the artery so completely shut in 40 hours. The aneurismal sac, which was of a most enormous size, reached from the common iliac artery to below Poupart's ligament, and extended to the other side of the thigh. The artery was deficient from the upper to the lower part of the sac, which was occupied by an immense quantity of coagulum.

The neck of the thigh-bone had been broken within the capsular ligament, and had not been united.

Upon consideration of all the circumstances of the case, to what are we to attribute this man's death? It did not arise from inflammation, for the viscera of the abdomen were perfectly free from it.

His death appears to me to have been owing to want of circulation in the aneurismal limb; for although the life and warmth of the other limb was preserved, that on which the aneurism was seated never gained its natural heat, which must have arisen from the great bulk of the aneurism, and from the disturbed state of the coagulum which it contained, which would prevent the

free course of the blood through the aneurismal sac. That limb never recovered its natural heat, there being seven degrees difference between the two extremities ; the sensibility also in the right limb was returning, which did not appear to be the case in the left. In an aneurism therefore similarly situated, I should apply the ligature before the swelling had acquired any very considerable magnitude.

There is still a circumstance, however, that remains to be decided respecting a ligature upon the aorta ; which is, in what manner it is to be afterwards separated : whether it should be left suspended at the wound, or cut off close to the vessel : whether the *presse-artere* of that ingenious Surgeon Mr. Crampton should be employed ; or some unusual material should be used as a ligature. Although the patient whose case I have here given, did not suffer from inflammation of the abdomen, yet I should much fear that if he had lived longer, an extraneous substance suspended amidst the intestines would have produced that effect.

Danger from an extraneous substance amidst the intestines.

My friend Mr. Lawrence has proposed that the silk usually employed for ligatures should be cut off close to the knot, so as to heal the wound over it. It has occurred to me that catgut would answer the purpose better, and I shall give the result of the trial which I have made, wishing it to be understood that I consider the subject at present as undecided, and only as one for future investigation.

Catgut proposed for a ligature.

Catgut, employed as a ligature, being more of the nature of the animal matter in which it is

embedded, will be more easily absorbed than silk ; or, if not even absorbed, will be less likely to excite irritation in the parts.

I have reason to hope that the following case will be considered as highly interesting and important, as the operation was performed upon a person so advanced in life as to lessen the hope which would have arisen from the more usual operation for aneurism.

I performed the operation at Guy's Hospital, where the patient, who is the subject of it, at present remains ; the notes of the case were taken by Mr. Hey, the son and grandson of the celebrated practitioners of that name at Leeds, who is now my pupil and clerk at Guy's Hospital. From the assiduity he has discovered in his studies, and the acquirements made in his profession, there is every probability that he will confer additional brilliancy on a name which ranks amongst the highest in the present race of the medical profession.

CASE.

Case of
Wm. Hey-
don.

October 15th, 1817, William Heydon, aged 80, of a spare habit, but enjoying good health, has been for some years without any regular employment on account of his age, but accustomed to take more or less of walking exercise ; his habits of life have been always regular. About three months ago he perceived a pulsating tumor situated very low down in the ham, and which at that time was about the size of a pullet's egg ; he could assign no cause for its appearance, and took but little notice of it. In

a few weeks, however, it increased so much in size, and the pulsation became so strong, that he was induced to shew it to a surgeon, who, finding it to be an aneurism, recommended him to come into the hospital.

The tumor was now larger than an egg, compressible, the pulsation very strong and perceptible, and the skin of a natural colour. The pulse, though slow and not weak, intermitted; and the pulsation of the tumor exactly corresponded with it. He complained of a considerable pain in the leg at times, and when the pain was most violent the leg was very much swelled. The motion of the joint was somewhat impeded.

24.—The usual incision for popliteal aneurism was made, and a single ligature was applied round the artery, both ends of which were cut off close, and the edges of the wound brought together by adhesive plaster; the substance made use of for the ligature was catgut, which had been previously soaked in water, about the temperature of 100°. The coats of the artery were very much relaxed, so as to occasion some difficulty in passing the ligature round it.

Operation.

Ligature made with catgut.

5½ P.M. About four hours after the operation, complained of a sense of coldness and uneasiness in the limb which had been operated on; its temperature was 80°, and that of the sound limb 84°. The pulse which beat 76 times in the minute was full and very irregular, but did not intermit.

25.—Has not passed a very good night, but feels comfortable this morning. Temperature

of the limb that has been operated on 84° , that of the sound limb 92° ; pulse 60, and intermits; but very rarely.

26.—Has had a good night, and feels more comfortable, though he still complains of violent pain in his leg at times; temperature of the affected limb 89° , that of the sound limb 92° ; pulse intermits once in every 10 or 12 beats.

27.—Much in the same state as yesterday; temperature of the affected limb 89° , sound limb 87° .

Wound
completely
united.

28.—The wound was dressed for the first time since the operation, and was found to be *completely* united; the pulse varies very much in its intermissions, but upon the whole they have been much less frequent since than before the operation.

29.—Temperature of the affected limb 89° , sound limb 87° .

30.—Temperature of the affected limb 89° , sound limb 93° ; the tumor in the ham is considerably lessened and has no pulsation; nor is any pulsation to be yet felt in the anterior or posterior tibial artery, though a free circulation appears to be carried on in the superficial veins.

31.—Temperature of the affected limb 90° , sound limb 91° .

Tempera-
ture equal.

November 1.—Temperature of the affected limb 91° , sound limb 91° .

7.—Nothing material has occurred since the last report; there has been very little variation in the temperature of the limb, or in the state of the aneurismal tumor, which continues gra-

dually to subside. The wound remains perfectly united and free from irritation.

15.—The tumor continues to diminish in size and is much softer; no pulsation can yet be felt in the anterior or posterior tibial artery: his health is very good, and he can walk about the ward with the assistance of a crutch.

24.—Continues to improve, no appearance of irritation from the ligatures; no pulsation in the anterior or posterior tibial artery.

In three weeks after the operation he walked in the ward with the aid of a crutch, and in the first week, he had no other complaint than coldness in the foot on that side, with some pain in the heel.

December 17.—His health is perfectly good; he walks without the aid of a crutch or stick; the swelling is reduced to a small size; and the part at which the incision was made has been and now is quite free from irritation.

I confess that this case gave me much pleasure; the great age of the patient, the simplicity of the operation, the absence of constitutional irritation and consequently of danger, and his rapid recovery, lead me to hope that the operation for aneurism may become at some future period, infinitely more simple than it has been rendered to the present moment.

Fig. 1.



Fig. 2.



PLATE VII.

Fig. 1. Shews the ligature upon the aorta in its anterior view ; *a, a*, aorta ; *b*, its bifurcation ; *c, c*, iliac arteries ; *d*, superior mesenteric artery ; *e, e*, emulgent arteries ; *f*, duodenum crossing the aorta ; *g*, the ligature placed around the aorta above its bifurcation ; *h*, clot in the left iliac artery.

Fig. 2. Posterior view of the aorta ; *a, a*, aorta ; *b*, bifurcation of the aorta ; *c, c*, iliac arteries ; *d, d*, duodenum ; *e*, ligature on the aorta ; *f*, clot formed above the ligature ; *g*, clot in the right iliac artery ; *h*, clot in the left iliac artery ; the clots strongly adhering to the inner side of the vessel. This preparation is preserved in the Museum at St. Thomas's Hospital.



Since the foregoing Essay was printed, I have seen a paper of Mr. Lawrence's in the Medico-Chirurgical Transactions, wherein an account is given of several cases in which the arteries have been tied with silk ; and the ligatures cut close to the knot : the result of these cases is as follows. Mr. Carwardine, of Thaxted, tied the femoral artery in this way for aneurism. The wound entirely united by adhesion. Mr. Lawrence tied the femoral artery of a patient sent to him by Mr. Ilott, of Bromley, on the 29th of March. The ligature came away at the end of May, and the wound then ceased to discharge. Mr. Kenrick Watson, of Stourport, tied the humeral artery for a wound of the vessel ; in a little more than two months the ligature was expelled. Mr. Hodgson tied the ulnar artery ; a swelling formed about the knot which was removed by incision five or six months afterward. Mr. Cumin, of Glasgow, transmitted to Mr. Lawrence a knot of a ligature which had been discharged from a stump at a considerable distance of time, two or three years from the operation. See Medico-Chirurgical Transactions, Vol. VIIIth.

ON

PHYMOSIS AND PARAPHYMOSIS.

BY MR. TRAVERS.

IT has upon many occasions appeared to me, that practitioners are too anxious to contend with the specific character of the venereal disease, to the neglect of the inflammatory state of the affected parts, and of the evils which mercury produces, when exhibited during its height.

The abuse of administering mercury for an acute gonorrhœa and recent sores, accompanied by phymosis, or an approach to that state, is of common occurrence, and it is far from being recognized by the profession as an established rule of practice, that its constitutional administration is inadmissible during the existence of active inflammation in cellular textures. The gangrenous inflammation which spreads and destroys with such terrible rapidity the male organ in certain irritable habits, and the integuments of the lower opening of the pelvis in young and delicate females, proceeds, I am convinced, from the injudicious exhibition of mercury oftener than from any other cause.

There is no class of cases exhibiting the local effects of impure intercourse in so formidable a view, in its nature so wholly distinct from a syphilitic taint, in its origin so purely casual, as

that which forms the subject of this paper. That it was not formerly so regarded, nor even by writers comparatively modern, it would be easy, if it were necessary, to shew. It is true that the mischievous consequences which I shall presently detail, rarely occur in private practice, a plain proof that they are the result of neglect or gross ill-treatment, and that such complaints in a recent state are easily remediable. But in hospital and pauper practice we continually meet with people under the constitutional influence of mercury, who are the subjects of inflammation of the penis, bordering on gangrene; often by their own indiscreet conduct; and sometimes, it must be confessed, by following the advice of persons who have the credit of being better informed.

Origin of
phymosis
from swollen
glans,

The most frequent origin of phymosis with gonorrhœa, is the swelling of the glans penis under inflammatory congestion, such as always accompanies more or less a gonorrhœa virulenta, and often a sore upon the glans. The inflammation of the urethra where the gonorrhœa has its seat, or the irritation of a sore, however inconsiderable, causes a detention of blood in the corpus spongiosum penis; and unless antiphlogistic measures are strictly pursued, the prepuce frequently retracted, and the surfaces of the glans and prepuce exposed and bathed, the latter becomes confined by the progressive turgescence of the corona glandis within it, and cannot be drawn back without very considerable pain and difficulty.

or prepuce.

Phymosis also follows the inflammatory œdema of the prepuce, to which its lax and abundant

cellular tissue disposes it upon very slight irritation, as gonorrhœal inflammation, or an excoriation, sore, or pimple upon the prepuce. The increased influx and retarded efflux of blood are promoted by the natural depending posture of the penis, a condition for the same reason most unfavourable to healing. The glans, compressed by the enlargement of the hood of the prepuce, which by the continuance of inflammation becomes a solid substantial enlargement, shrinks away from the aperture of the prepuce, and becomes buried in its folds.

In either case the profuse and incessant discharge of gonorrhœal matter is pent up, and lies in the plies and folds of the membrane, which is reflected from the prepuce over the glans penis. This matter is often furnished by the inflamed surface of the corona glandis and prepuce, and sometimes the gonorrhœa is altogether external. The chaps and abrasions, which often accompany a gonorrhœa from its commencement, of the fine cuticular covering of these parts, are irritated and ulcerate; and when the inflammation is subdued, and the discharge furnished by the sores is arrested, it is in consequence of adhesions which have taken place between the opposite surfaces of the glans and prepuce, and thus a permanent phymosis is the cost of cure.

The confinement of the matter.

These incipient states of the phymosis are generally uncombined, but it is easy to see that they may co-exist, as they of necessity do in a more advanced stage; and this is not unfrequently the case.

Paraphymosis.

Erysipelatous inflammation with considerable œdema, and the anasarcaous swelling of the prepuce, are occasional causes of the paraphymosis. But it is for the most part, an artificial or accidental, not a natural morbid condition, if we except the cases of malformation or the destruction of a portion of the prepuce by former sores. It is, therefore, much less frequent than the phymosis. The patient, anxious to prevent or to remedy the incipient phymosis, produces the contrary state. There is the same œdematous tumefaction of the prepuce and glans, and if allowed to continue until the supervention of the adhesive stage, it is attended by some of the evils described as consequent upon the phymosis, both being equally cases of stricture. But the pain of paraphymosis, and the obvious inconvenience and deformity of a permanently exposed glans, and enormously enlarged prepuce, bring it sooner to notice, and it is so easily reduced by the aid of timely scarifications of the swollen prepuce, fomentations, and compression of the glans, that it is rarely suffered to remain unrelieved. Besides, the exposure of the glans removes the peculiar circumstances by which the phymosis is rendered of such formidable consequence.

Heister says, that the paraphymosis is frequently produced *in coitu*, where the penis is larger, or the vagina is smaller than usual, and comments on the injustice of the suspicions which newly married men have inferred of the chastity of their wives, from a circumstance which warrants the very opposite inference.

Both the phymosis and paraphymosis occa-

sionally arise from circumstances wholly unconnected with sexual commerce. “Young boys,” says Mr. Latta, “frequently bring on a paraphymosis by retracting the prepuce in diversion, until they become unable to pull it forward again. As they conceal this for some time through fear, it is not uncommon for the parts to become inflamed and swelled to a great degree, and I have even found gangrene taking place before the matter was found out*.” I saw lately a case of troublesome paraphymosis with swelled testicle from a blow, and another of paraphymosis from the irritation of a hair lodged behind the corona glandis, which had produced a superficial ulceration.

Where either state is accompanied by extreme enlargement of the body of the penis or glans, it occasions a degree of temporary stricture upon the urethra, so as to induce a partial retention; great irritation is propagated from the neck of the bladder to the point of the penis, and the urethra in a state of high inflammation, more readily ulcerates, and thus relieves the symptoms of retention.

Stricture
from dis-
tension.

“It is easy to understand,” says Bichatt, “how inflammation of the urethra may occasion retention of urine. We have only to bear in mind that inflammation (especially of cellulous parts) is always accompanied with swelling; and that swelling of the parietes necessarily diminishes the calibre of a canal.”

* Latta's Surgery, vol. I. p. 391.

A case of this description has occurred under my notice since the former edition of this volume.

† Œuvres Chirurg. de Desault. tom. iii. p. 189.

Ulceration
of the pre-
puce.

Where the glans has originally been the seat of chancre or common superficial sores, the state of tension is relieved by the sloughing of the glans, and the urine infiltrating the elongated prepuce, gives occasion to circumscribed ulcers of the prepuce, by which it is discharged. The ulceration of the prepuce, from the lodgment and retention of urine within it, where the mouth of it is closed by adhesion, takes place to a greater extent; for the retained urine is extravasated into the cells of the connecting membrane, and gangrene ensuing, denudes the entire body of the penis even to the pubes. The urine passes by ulcerated orifices in the urethra, and by the irritation which its constant dribbling creates, the sloughing process is kept up and aggravated. In the debilitated state of the system produced by large quantities of mercury, cases now and then occur in hospital practice, in which the whole of the external organ becoming affected with an erysipelatous inflammation, gangrenes, and falls off from the pubes, leaving only the vestige of the bulb in the form of a fleshy tubercle beneath the symphysis pubis, from which the urine is discharged.

Swollen
labia, or
clitoris and
nymphæ of
females.

In women, as in men, the gonorrhœa virulenta is generally attended with swelling of the external parts. The labia pudendi frequently attain an enormous bulk, and very slowly recover their natural size, if they do not advance to supuration. Sometimes the swelling exclusively affects the clitoris, its preputium, and the nymphæ, which, if not reduced, become dense, hard, and permanent elongations. But the different structure of the organs occasions a difference in

the symptoms as well as the seat of the disease, and seldom exposes females to the danger of sloughing from this cause.

The state in which phymosis presents itself are three.

1. With tumefaction from inflammation of the glans or prepuce, easily admitting of a gradual reduction by the assiduous employment of those means which diminish inflammation and the bulk of the enlarged part. 1st Stage.

2. That in which inflammation has supervened upon phymosis of longer standing; where the swelling is excessive, so as to compress and partially stricture the urethra, and unrelieved, tends to abscess, ulceration of the urethra, extravasation of urine, and gangrene of the integuments. 2d Stage.

3. That in which the phymosis is chronic, confirmed, or irreducible; the glans and preputium being in close adhesion, from cicatrization of their inflamed surfaces. Here abscess or fistulous ulcer is formed in the elongated prepuce anterior to the glans; the cellular texture of the prepuce is wholly obliterated and condensed, and resembles the glans itself in size, and often in figure. On slitting it open an ulcerated groove is seen, through which a part of the urine has dribbled. 3d Stage.

Sometimes in this state of phymosis we find the glans studded with numerous vascular warts; sometimes it is reduced to a mere bud by ulceration; the proper urethra, having a small contracted orifice, is with difficulty found, and

will scarcely admit the blunt end of a probe. At other times I have found a deeply ulcerated groove, nearly detaching the glans from the corpora cavernosa penis.

Treatment.

In the first of the states described, injections of tepid water, or milk and water, beneath the foreskin, and the immersion of the penis three or four times a day in a tepid bath, with a well contrived support of the part at an angle upwards with the symphysis, constitute the best *local* treatment. To this the free employment of leeches, will be often found an useful addition, if applied at some distance from the swollen part. As the inflammation subsides, injections of weak goulard wash or the solution of alum or liq. calcis and calomel may be substituted. To reduce the inflammation, and thereby lessen the bulk of the glans, is the indication; when this is accomplished, the reduction of the phymosis follows almost spontaneously.

Elastic catheter.

In the second state, in addition to such palliative measures as suggest themselves, as emollient cataplasms and fomentations, if a small elastic gum catheter be introduced into the bladder and retained in it, it will remove the danger of ulceration of the urethra, or at least prevent extravasation where ulceration has already begun.

This is not a practice indicated by the degree of stricture, which is seldom considerable enough to require it: but by the approaching danger of extravasation. It should not therefore be taken up unless the cellular membrane

of the penis has advanced to suppuration. I believe that its timely use prevents the breach of the urethra *.

It is not adviseable to cut the inflamed prepuce, nor indeed any inflamed part. I lately saw a phymosis induced by a thickened and rigid state of the membrane of the prepuce during the free use of mercury constitutionally and locally, for the cure of two sores, each of the size of a split pea, situated one on each side of the anterior fold of the prepuce. It was the opinion of an eminent surgeon that these sores, which were thoroughly intractable, would not heal until the prepuce was freely divided, and impressed with the same idea, after poulticing for some days, I slit it up. The sores immediately healed, but the wound as quickly assumed the same indolent and intractable character which had belonged to the sores, and was so slow in healing, that it seemed to be only a transfer of the disease from one part to another.

Objection
to the knife.

In a case of extreme enlargement, where the retention was urgent and livid discoloration marking the approach of gangrene had begun, I slit up the prepuce: but although considerable relief was afforded, the recovery of the part was very slowly effected.

* The reader will find some judicious observations on this subject in the Surgical Works of Desault, by Bichat. Art. Retention d'Urine dans l'Urèthre: tom. iii. p. 189, 249. et seq.

CASE.

Slough of
the prepuce
from in-
flamed
phymosis.

June 13, 1816.—John Baker, aged 19, contracted a gonorrhœa six months ago. During the recent use of mercury, which he took by the advice of a friend, the inflammation began. The penis is much swollen and inflamed quite to the pubes, and a profuse and purulent discharge issues from the prepuce, which is œdematous, ulcerated, and sloughing around the glans.

Ordered : H. aperiens : Catap. commun.

19.—The glans protrudes in a sound condition through a sphacelated opening in the prepuce.

Ordered : Decoct. cinchon. c̄ acid : Catap. c̄ lot. nigrâ.

27.—The upper portion of the prepuce has fallen off, the lower is pendulous ; the disposition to slough appears to be checked ; the inflammation is abated.

July 3.—The remaining portion of prepuce has contracted, and is granulating kindly.

After this, in the month of August, the parts re-assumed an unhealthy aspect, which was removed by the nitrous acid lotion, the bark being continued.

Sept. 18.—Sores healed.—Discharged.

CASE.

Slough of
the glans
penis, and

April 11, 1816.—Thomas Adams, aged 42, admitted with a smart hemorrhage from the

penis, attended with phymosis of a fortnight's duration, following a chancre on the glans. There is no sign of mercury having been taken. The hemorrhage yielded to pressure and cold applications.

hemorrhage with phymosis.

Ordered: H. aper: Lot. alb.

20.—The phymosis is reduced, and the glans appears in a state of ulceration; a part has sloughed, and hence the bleeding proceeded.

Ordered: Lot. acid. nitr. d: Ung. hydr.

After a five weeks' course he was discharged cured.

CASE.

Nov. 16, 1815.—Dennis Prendergast, aged 34, was salivated six weeks ago, for a chancre on the prepuce, to which phymosis succeeded. The prepuce has since been much swollen and elongated, and an ulcerated opening, which has a sloughy appearance, is formed upon one side of it, through which the urine passes; the os preputii being closed by adhesion.

Slough of the prepuce and glans penis, with phymosis.

Ordered: Catap. ē lot. nigrâ.

Dec. 1.—The sore looks clean; the prepuce as before, but uninflamed. A curved bistoury was passed through the closed extremity of the prepuce, and out at the ulcer, about an inch and a half distant; and the projecting portion, of which the canal was obliterated, circumcised. Scarcely a vestige of the glans penis remains; the orifice of the urethra upon the dorsum is discovered with difficulty, being very small.

Ordered : Cerat. simp. \bar{c} catap. A portion of bougie to be worn in the orifice of the urethra.

20.—Wound nearly healed ; has been much relieved by passing urine freely since the operation. Complains of rheumatic pains, for which he took the pulv. ipec. comp. and decoct. sarsap. and was discharged cured.

CASE.

Slough of the prepuce and glans penis, following phymosis.

Feb. 8, 1816.—Alfred Wright, aged 18, of a scrophulous habit, had a gonorrhœa four months since, for which he took mercury, so as to make his mouth tender. Under this treatment the penis swelled greatly, and phymosis succeeded, the prepuce sloughed to a considerable extent, so that the glans penis passed through it on the upper side. The remaining portion of the hood of the prepuce, the frenum, and the front of the glans also sloughed. The urine now flows by an aperture in the dorsum, behind the corona glandis, where is situated a deep, irritable, and ill defined ulcer, disposed to spread.

Ordered : H. aper. p. r. n. : Antim. tartar. gr. $\frac{1}{4}$. opii gr. i. f. pil. om. noc. sum. ; Decoct. cinchon : cerevisiæ fort. lb. i. per diem. To the part, catap. cerevisiæ : this was afterwards changed for the lot. acid. nitros. d. \bar{c} catap. and when the ulcer had cleansed, for the lot. argent. nitrat. : ung. hydr. mit. : ung. calam. &c.

As the health slowly but progressively improved, the sores healed.

Discharged in May following.

Some time subsequent, Wright applied with an unhealthy ulcer surrounding the nail of the index finger of the left hand. He was admitted, and shortly after discharged, the sore being healed by the use of the *lot. arg. nitrat.* From bad living and neglect, the ulcer broke out afresh, and he was again admitted, when it had assumed a much worse appearance, having extended to the second phalanx. Various lotions were applied, and constitutional remedies employed, without arresting the sloughing process. This was at length effected by washing it with a strong lotion of muriatic acid. Separation took place at the first phalanx, and as the sound integuments upon the under side projected beyond the joint, they were brought up as after an amputation with a flap, and the wound healed, forming an excellent stump without the aid of the knife.

July 24.—Discharged in good health.

CASE.

April 11, 1816.—Charles Wood, aged 33. An unhealthy ulcer upon the penis has destroyed the prepuce and glans, and is now eating deep into the body of the penis. The urine escapes through an aperture on the dorsum penis. The disease was contracted six months ago. For sores, on the glans and prepuce, with phymosis, he was salivated, and sloughing of the inflamed parts was the consequence. At present the ulcer is irritable and painful, its edges are ill

Slough of
the prepuce
and glans
penis, fol-
lowing
phymosis.

defined, and it is surrounded by a livid hue. He has also a bubo discharging in each groin.

Ordered :—Catap. \bar{c} lot. nigrâ : Decoct. cinchon : Pil. hydr. gr. x. opii gr. i. o. n.

26.—Sore on the penis and buboes clean and granulating.

29.—Sores still healthy in appearance, but his mouth is slightly sore, and he is much indisposed, complaining of head-ach, languor, oppression of the præcordia, &c. His skin exhibits an eruption in patches of a scarlet colour, not elevated, but rough and furred.

Omitt. pil. hydr : H. aper : Contin. decoct. cinchon : Cerev. f. lb. i. per diem.

May 4.—Eruption has disappeared ; health improved, but sores languid.

Repet. pil. hydr. sine opio.

20.—Health in all respects improved, and sores healed.—Discharged.

CASE.

Slough of the penis, with phymosis, producing extravasation of urine.

Aug. 15, 1816.—John Weston, aged 29, for six months past has had a phymosis, which came on while taking mercury for gonorrhœa. Two days prior to his admission, the os preputii became closed, and the urine accumulating within it, distended the integuments enormously. They are now in a state of gangrene. He has passed scarce any urine for two days.

Ordered : Catap. \bar{c} fotû communi.

16.—A copious discharge of purulent sanies and urine took place yesterday afternoon, by

which he has been greatly relieved. The tumefaction has considerably subsided, and he has this morning passed his urine through the slough at pleasure. About the middle of the dorsum penis, a line of separation is formed in the integuments. Pulse 112, small and feeble, bowels torpid, tongue foul, and perspiration copious.

Ordered: H. cathart. statim. et p. r. n. rep :
Decoct. cinchon : Cerev. f. : Lot. acid. nitr. c̄
catap.

19.—The gangrenous prepuce has fallen off, and healthy granulations are seen upon the line of separation. The glans penis is sound.

21.—Surface clean. Suppuration free. Cerat. calaminæ.

31.—Granulations healthy. General health restored.

Sept. 18.—Sores healed. Discharged.

CASE.

July 4, 1816.—Charles Barber, aged 28, of a weak constitution, and evidently suffering from poverty, contracted a virulent gonorrhœa nine months ago, which was succeeded by phymosis, and being neglected, by ulceration of the prepuce. In this state he fell into the hands of an advertising quack, who drenched him with mercury. The prepuce sloughed rapidly during the period of his salivation. The penis, on admission, completely divested of integument, had fallen down from the pubes by the destruction of the ligamentum suspensorium;

Slough of the entire integuments of the penis and pubes, following phymosis.

the integuments of the pubes were sloughy, and a probe passed under the symphysis pubis, in front of the bladder, for near two inches : the urine escaped through fistulous openings in the dorsum penis. Pulse is quick and feeble, but his appetite is good; sleeps well, suffers but little pain, and has much less constitutional commotion than could be expected.

July 5.—Ordered. H. aper: Decoct. cinchon. \bar{c} conf. arom: Cerev. f. lb. i. ad lb. ii. per diem: Catap. lini.

9.—Discharge improved, but sloughing continues. Lot. acid. nitr. \bar{c} catap.

13.—Pulse improved; sores somewhat cleaner; complains of much pain at the symphysis pubis, groins, and thighs.

15.—A fuller and slower pulse; sloughing has ceased, and granulations are springing both from the penis and pubes.

22.—Scrotum now discoloured and excoriated; lot. alba; the sores are indolent, and the purulent discharge profuse.

27.—Sores much improved.

31.—Discharge still considerable, but healthy, and he is free from pain. The excoriations of the scrotum terminated in sloughs, and these have left ulcers on the septum scroti, and around it.

August 26.—The sore on the pubes and penis is so far healed, that the urine begins to pass in quantity by the natural passage; the sores are improved by the nitrous acid lotion.

Sept. 4.—The whole of his urine is now voided by the original passage; his health has been

daily improving for the last month : the extensive surface which had been exposed by the slough, and the sores which afterwards appeared in the scrotum, were cicatrized in October following, when he was discharged cured.

The treatment of these cases when presenting themselves in the states above described, requires little if any further illustration. The important practical lesson which such cases convey, addresses itself particularly to those who venture upon the use of mercury before it can be used with safety, and for the most part in cases where the probability is, that it ought not to be used at all. The cleansing of the surface, and the support of the patient, are the obvious indications. As the penis becomes covered, which is a very slow process where the corpora cavernosa are denuded, a catheter should be worn to prevent the breaking out of fresh sores on the scrotum and pubes from the excoriating discharge of urine, as well as for the purpose of preventing such an obliteration of the passage, as occurred in the following

CASE.

A sailor, who had been for some months in the hospital on account of extensive ulceration of the fauces, was at the same time labouring under an habitual retention of urine ; the penis was shortened by the loss of a great portion of the glans and the prepuce, from chancre, concealed

Case of abscess from closed urethra.

by phymosis, while a patient in a naval hospital, a twelvemonth prior to his admission. The urethra had been suffered to close in the healing of this sore, and was found upon examination with a probe and catgut bougie, to be imperforate, at the distance of an inch from the orifice. His stillicidium was extremely painful, and the irritability of the part so great, that the introduction of the smallest instrument occasioned very severe pain. In this state an abscess formed in the corpus spongiosum behind the stricture, and upon opening it, urine mixed with pus flowed from it. Through this opening I passed a catheter with ease into his bladder, which was retained there, and completely relieved the dysuria; with a narrow curved bistoury, a passage was then opened through the upper portion of the penis, where the urethra had been obliterated. A probe was introduced, and afterwards a bougie was worn in the new urethra; and when in this stage of the treatment, the catheter was about to be passed through it into the bladder, thus to re-establish the continuity of the urinary passage, the man, in fear of any further operation, abruptly discharged himself, and sacrificed the object of the treatment, after having endured the pain.

Importance
of the
operation
in the con-
firmed
state.

In the chronic and confirmed phymosis, there can exist no doubt of the propriety of dividing or circumcising the prepuce, adopting one or the other method according to circumstances. I have not met with that success in the use of prepared sponge tents, or any other mode of dilatation, of which I have heard some practitioners

speak as superseding the operation. A dilating instrument was contrived by Trew, consisting of two elastic plates, which were introduced within the prepuce, and regulated by a screw*. Where parts have recovered soundness, patients are naturally unwilling to submit to an operation, for the sake of a remote advantage, or the removal of a mere inconvenience. But in this case more cogent reasons may, and ought to be stated. The diseases to which a permanent phymosis gives birth, are not simply those, which result as a consequence of its recent formation. Mr. Hey's cases of malignant ulceration, complicated with congenital phymosis, are sufficiently instructive, and to these I beg leave to refer the reader†.

The congenital phymosis is not uncommon. It is a source of inconvenience in micturition and coition. I believe that it more frequently depends upon a short frenum, than any other circumstance, and that the frenum of the prepuce may be in these cases divided with similar advantage, as the frenum linguæ in the case of tongue-tied children. I have rarely seen intractable ulcers of the penis without phymosis, recent or original, and have observed the advantage which Jews derive in the healing of sores from the exposure of the glans.

* See Heister's Surgery, Vol. II. plate 26: fig. 5. I join with Heister in much doubting its usefulness, and that of any similar contrivance. The thin integument of the prepuce is lacerated when forcibly extended.

† See Practical Observations in Surgery, 2d ed. chap. xiv. "On the Cancer of the Penis."

CASE.

Congenital
phymosis
with gonor-
rhœa,
and conse-
quent ulce-
ration of
the pre-
puce.

Aug. 7, 1817.—William Hollington, aged 19. This man has a natural phymosis, which had produced little if any inconvenience, until a month ago, when he became the subject of gonorrhœa. Upon its appearance he took mercurial pills for a few days, during which time an inflamed spot on the upper part of the prepuce sphacelated, and allowed a protrusion of the glans through the opening. The prepuce is at present swollen and inflamed, and the discharge is copious, but not unhealthy. Ordered: Catap. ē fotû. H. cathart. p. r. n.

16.—The inflammation having sufficiently subsided, the extremity of the prepuce beyond the ulcerated opening was removed by circumcision. A poultice was again applied.

20.—The wound appears languid. To be dressed with the ung. hydr. nitr.-oxid.

25.—Cicatrization advancing kindly.

Sept. 3.—Discharged cured.

The growth of warts is favoured by the existence of confirmed phymosis during the state of inflammation; and indeed often takes place where the phymosis is recent. In other instances the warts produce the phymosis, as in the following

CASE.

Warts fol-
lowed by
phymosis.

Aug. 7.—George Beard, aged 19. Six weeks ago warts began to form at the extremity of

this lad's prepuce, and increasing in size and number soon prevented him from denuding the glans penis, which, he says, has been free from inflammation and sores. They are vascular, irritable, fungating, and protrude beyond the orifice of the prepuce, and being partially everted, give a cauliflower-like appearance to the end of the penis. This bunch is of the size of a walnut. Behind it the prepuce is swollen, tense and inflamed, having several openings through which isolated warts are protruding, as if springing from the glans. A probe passes readily through the centre of the anterior cluster round the glans, and out at the several openings of the prepuce.

20.—The part has been poulticed since admission; and to-day the bunch of warts and the portion of prepuce from which they grew, were removed by one stroke of the curved bistoury. The glans being denuded appears sound; the principal warts are attached to the prepuce; two small ones only are seen upon the glans. Poultice to be repeated.

27.—The liq. plumb. acet. has been applied to the remaining warts; it has acted well: they are ulcerated at their bases, and much diminished in bulk.

Sept. 2.—Other warts have been removed by the scissors.

4.—A narrow border of prepuce was this day divided, confining a bunch of warts, which are connected by peduncles to the glans.

An ointment of arsenic was afterwards ap-

plied to them with the best effect, and he was discharged cured.

I shall add a case of malignant ulceration of the prepuce and penis, following phymosis, which appeared to have been produced by the persevering use of mercury during the period of inflammation.

CASE.

Malignant
ulcer of the
penis, fol-
lowing
chancre
and phy-
mosis.

Oct. 26, 1815.—Daniel Partridge, admitted for an extensive ill-conditioned ulcer round the corona glandis, which seemed disposed to spread, being surrounded by much inflammation of the sound surface. About eight weeks before he contracted a chancre, for which he was rapidly salivated; during his salivation swelling and phymosis took place, and the ulcer increased until it had nearly destroyed the prepuce.

For some time after his admission the sore appeared to cleanse and improve under the blackwash poultice, after which it became languid and covered with a white crust; which the application of the *argentum nitratum* did not prevent from forming.

In January following, it is noted that the sore has healed in part, but is no sooner cicatrized on one side, than it breaks out in another, and that a gentle course of mercury which now affected his mouth, had in no sense improved the condition of the sore.

Feb. 25.—This man had taken mercury sufficient to heal the sore if it were venereal. He had no secondary symptom of lues. The sore has a carcinomatous more than syphilitic character. Its edges are thick, inverted in some places and everted in others; its surface is uneven, fungous granulations covering it at irregular distances, divided by hollows covered with a dense coat of white opaque lymph; it discharges a thin ichor. The root of the prepuce is hardened into a ridge behind the glans. The man complains of constant shooting pains through the body of the penis, and the glands in the groin are slightly swelled and tender. His health, which was lately robust, is much impaired. His countenance is sallow and heavy, and he is much emaciated. Stimulant detersive applications which have been made to the part, have neither given uneasiness nor produced any favourable change in its aspect.

Ordered to a clean ward. Soothing applications were now used, and the nitric and sulphuric acids, the liq. arsenicalis and other tonics exhibited, by which his health was benefited; the conium, hyoscyamus, and remedies of this class were tried, but without benefit; the sore remained as reported.

March 25.—Amputation was performed an inch above the diseased part. The stump healed kindly, and he was discharged cured, in May following.

This appears to have been a simple sore rendered untoward and intractable, and at length threatening malignity from what might be termed the cachexia mercurialis.

It is my design by these brief observations, to direct the surgeon's attention to the early stage of the phymosis : to recommend it as an invariable practice to examine the naked glans, before venturing upon the constitutional use of mercury : to point out the aggravation occasioned by an habitual though partial retention in the state of the extreme swelling, and the advantage which may be derived from the introduction of a small elastic gum catheter, especially where ulceration is threatened, in preventing extravasation and preserving the urethra during healing : lastly, to shew the expediency of the operation in all cases of confirmed phymosis, whether congenital or the result of inflammation.

I offer no apology for giving a degree of importance to this purely practical subject, to which the senior members of the profession may consider it to be unentitled. The cases, if they were rare, must be acknowledged to be sufficiently deplorable ; but, unfortunately, they are of common occurrence, while the prevention of them, by a proper view of their nature and treatment, is easy and obvious. I have thought, therefore, that some advantage might be derived from these observations.

ON

EXOSTOSIS.

BY MR. ASTLEY COOPER.

EXOSTOSIS is a preternatural growth of ossific matter, generally producing a circumscribed swelling upon the bone on which it originates. This definition, although true, with very few exceptions, is not at all periods of the disease, or in every example of it, strictly accurate; for I have examined exostoses in the early part of the complaint, in which ossific matter had not yet been deposited, but in which, from dissection of other cases, I know that such a deposition would in future have occurred. Definition.

Exostosis has two different seats; it is either *periosteal* or *medullary*. By the *periosteal* exostosis, I mean a deposition seated between the external surface of the bone, and the internal surface of the periosteum, adhering with firmness to both surfaces; and by the *medullary*, is to be understood a formation of a similar kind, originating in the medullary membrane and cancellated structure of the bone. Two seats of exostosis.

With regard to its nature, exostosis is of two kinds, either *cartilaginous* or *fungous*. By the *cartilaginous*, is intended to be expressed that species which is preceded by the formation of a

cartilage, which forms the *nidus* for the ossific deposit: and by the *fungous*, is to be understood, a tumor of softer structure than cartilage, yet firmer than fungus in other parts of the body, containing spicula of bone, malignant in its nature, depending on a peculiar state of constitution and action of vessels: a disease similar to that which Mr. Hey has denominated *fungus hæmatodes*, but somewhat modified by the structure of the part in which it originates.

The venereal exostosis, or node, although depending upon a different cause, is still a cartilaginous exostosis. But this subject I do not now intend to consider, as it ought rather to form part of an essay on the venereal disease.

Seat.

I know no bone in the body which is not liable to the formation of these diseases, although there are some in which it much more frequently occurs than in others.

Bones of
the cranium.

Upon the bones of the cranium we see both kinds of exostosis. That which forms between the outer table of the skull and the pericranium is of an extremely hard consistence, is generally attended with little pain, and does not usually acquire any considerable magnitude; but a very large tumor, with a basis of bone, was lately removed by Sir Everard Home from the head of a person in St. George's Hospital. Four of these have been known to arise from the same os frontis; one of larger, and three of smaller size. The fungous exostosis springing from the diploë of the skull, is of less firm consistence, and is endowed with a greater degree of vascularity than the former. It is of a malignant kind,

and is found to proceed through the inner table of the skull, occasioning disease of the dura mater : and by its pressure upon the brain to produce a diseased state of the functions of that organ, by which means life is destroyed.

Exostosis of the facial bones is of very frequent occurrence. We have in the collection at St. Thomas's a skull which I took from a fish-woman who died in that Hospital, who had long been remarkable, (even at Billingsgate,) for her hideous appearance. Two large swellings had been formed under the orbits in the fore part of the cheeks, between which the nose appeared wedged, and the nostrils were closed ; each eye projected considerably from its socket. This person was seized with a fit, which seemed to be of an apoplectic nature, and in that state was brought to St. Thomas's Hospital, where she almost immediately died. Upon examination of the head an exostosis was found growing from each antrum, and forming the large swellings upon the cheeks : these also projected into the orbits so as to occasion the protrusion of the eyes. On the left side, the exostosis entered the cranium, projected inwards through the orbital process of the os frontis, and occasioning such pressure upon the brain, as, under a considerable excitement of the vessels of that organ, to produce apoplexy, which proved fatal to her.

Bones of
the face.

The alveolar processes of the upper and lower jaw, are very frequently the seat of this disease ; and I have at present in Guy's Hospital, an example of exostosis of the lower jaw springing from the medullary membrane and cancellated

Upper and
lower jaw.

structure, in a girl, for which I had occasion to perform an operation, which will be related more at length hereafter.

There is a large spongy exostosis in the collection at St. Thomas's Hospital, with the history of which I am unacquainted, except that I have heard from Mr. Cline, that it grew from the lower jaw.

A woman of the name of Williams, who is now an out-patient at Guy's, and whose case will be found more particularly detailed hereafter, has a fungous exostosis growing from the symphysis of the lower jaw, forming two livid projections at the alveolar processes of the *incisores* teeth, and a large fungus at the chin.

Mr. Waring, surgeon of St. Mary Cray, sent me a child, with a similar disease in its jaw, which has since acquired very considerable magnitude. And with Sir Charles Blicke I attended a case of the same kind springing from the upper jaw, which was successfully removed by the knife and subsequent application of the actual cautery, the use of which was proposed by Sir Charles Blicke.

Spine.

Exostoses from the spine are of rare occurrence, if we except those ossifications of the ligament covering the intervertebral substance, which sometimes in old persons destroy the flexibility of the part, and form considerable projections on the anterior and lateral surfaces of the vertebræ.

Dr. Moncey, formerly physician at Chelsea, who died at a very advanced age, had the intervertebral substance thus covered with

ossific matter, rising into considerable masses. Perhaps however I ought not here to mention these appearances; as they are not true exostoses; but ossifications of the natural structures, bearing some analogy in principle to those which are produced in the larger blood-vessels of old people.

I have however seen an exostosis arise from the sixth or seventh cervical vertebra, or perhaps from both. The subject of it was a woman who was admitted into Guy's Hospital, having no pulse at the wrist or elbow. Her hand was of a venous redness, always cold, generally benumbed, yet seemed painful; there were small gangrenous spots upon it. On examination of the superior part of the arm, these appearances were found to be the consequence of a projection of the lower cervical vertebra towards the clavicle, and consequent pressure upon the subclavian artery. Whilst she was in the Hospital, by means of warmth and friction, the natural heat of the arm and hand was greatly restored, the further increase of the swelling seemed suspended, and, at the time she was discharged, the arm was in a very improved state; nevertheless the pulse at the wrist had not returned.

The ossa innominata are also sometimes affected with this disease, which is more frequently seated at the posterior sacro-iliac symphysis than on any other part of these bones. Boyer mentions an instance of one growing from the os pubis, which produced a retention of urine, prevented the introduction of the ca-

Ossa innominata.

theter, and thus occasioned the destruction of life.

Ribs.

Exostosis sometimes forms upon the ribs. A lady applied to me with a very large swelling, which was occasionally severely painful, situated directly behind the right breast: it was extremely hard, quite immoveable, and seemed to sink between the ribs. I requested to be informed of this patient's dissolution, which, from her exhausted appearance, I considered to be most probably at no great distance, that I might have an opportunity of examining the part. However, I afterwards heard of her death without having the opportunity afforded me.

We have a preparation in the collection at St. Thomas's Hospital, of a very large exostosis seated between two of the ribs, which seems to have been contained in a tumor between the two bones.

Clavicle.

Exostosis of the clavicle is extremely rare, if we except the venereal enlargements of that bone; nor do I recollect to have met with any instance of this affection on the scapula.

Scapula.

Os humeri.

Upon the os humeri, I have seen a growth of bone at the insertion of the deltoid muscle. It arose about the size and form of the finger end. As it occasioned no inconvenience, and had not lately increased, I did not recommend any thing to be done for it. We have likewise, amongst the preparations at St. Thomas's Hospital, an exostosis of the os humeri of considerable size, which occupies the whole circumference of the bone; the periosteum appears in this bone to have been generally diseased, as the surface of the humerus

is extremely irregular. We have beside an immense exostosis occupying the superior half of the os humeri, excepting that the cartilaginous head of the bone is unaffected. The particulars of this case will be hereafter detailed.

There is also, in the same Museum, a humerus with the shell of the bone considerably expanded, the periosteum over it thickened, and in the seat of the cancellated structure several hydatids had formed, which had been the cause of the enlargement of the exterior surface of the bone as well as of the increase of its cavity.

The ulna is very rarely affected with exostosis, excepting sometimes at its lower part near to the wrist, where I have, in the living subject, seen some enlargement of the bone. Ulna.

On the radius we have an excellent preparation of this disease growing to an enormous size, ulcerated upon its surface, and that ulceration having gone on to sloughing; thus exposing the exostosis. This case occurred in Saint Thomas's Hospital, where the arm of the man was obliged to be amputated in order to preserve life. Radius.

We have also a fine specimen of exostosis upon the metacarpal bones growing to a very considerable magnitude; a section of which shews extremely well the internal structure of the disease. Metacarpal bones.

A young friend of mine has an exostosis growing on the metacarpal bone of the little finger, which undoubtedly arose from a blow. Fingers.

I have twice removed an exostosis from the

second phalanx of one of the fingers ; a considerable portion of it was still cartilaginous, but at its root it was bony. The first operation being insufficient to prevent a recurrence, a second was rendered necessary.

Os femoris.

The os femoris, of all the bones of the body, is most frequently the subject of this disease. I have seen it arising from its upper part at the trochanter major, and spreading into enormous masses which projected into the groin, and upon the ilium. We have a preparation of it occupying the whole of the bone from a little below the trochanter to the condyles, forming a considerable mass, or rather masses of bone : and some specimens where it is principally periosteal ; the shell of the original bone not being yet absorbed ; and others in which portions of this shell have been removed. We have also examples of small projections between the periosteum and the bone, rising in the direction of the triceps femoris ; one of the best of which was given to me by Mr. Dodds, jun. son of the surgeon of Haslar Hospital. (See Plate.)

Tibia.

Next to the femur, the tibia is most frequently affected with exostosis of the periosteal kind. The seat is at the insertion of the sartorius and gracilis muscles ; and now and then at the insertion of the ligament of the patella at its tubercle. We have specimens of this disease in our Museum at St. Thomas's, one in particular, in which the bone has formed a large cavity, covered with a strong bony case, similar to that which I have mentioned in the lower jaw ; and another

in which it is expanded into a large spongy shell. We have also an example of this disease growing upon the surface of the head of the tibia, and which I believe to have been of the fungous kind. I have lately seen one arising from the fore part of this bone just above the ankle joint, with the flexion of which it begins to interfere.

A man was admitted into Guy's Hospital under the care of Mr. Forster with a large tumor seated upon the upper part of the tibia, which felt soft, and yielded to the finger, so as to give the impression of its being a fungous disease. Mr. Forster directed adhesive plasters to be applied, by the pressure of which the size of the swelling was so much reduced, that the patient quitted the hospital, satisfied that a continuance of the means which he had applied would suffice to accomplish a cure. In a few weeks he returned with the swelling greatly increased, when he was admitted under the care of Mr. Lucas, who made an incision into the swelling, and discharged several hydatids, which were of the common globular kind. However, constitutional irritation, with sloughing of the integuments which covered the swelling, induced the necessity of amputation. An incision being made into the tumor after the removal of the limb, a large nest in the bone was found, containing numerous hydatids. Upon boiling the section opposite the bony nest, a fracture was found in the tibia, which had probably been produced by the disease, as the patient did

not mention it. This fracture had united, but irregularly.

Fibula.

The upper part of the fibula, near the head of the bone, is sometimes enlarged, and its lower end very frequently so, where it is connected by a ligament to the tibia. This enlargement, however, arises perhaps more frequently from common adhesive inflammation in the bone than from true exostosis.

Metatarsal bones.

The metatarsal bones are now and then the seat of exostosis. I have known half the foot obliged to be amputated for this disease, placed at the extremities of those bones towards the toes.

Toes.

Two instances of exostosis under the nail of the great toe, projecting considerably beyond it, have occurred in my practice ; one of which occasioned so much pain and inconvenience to the lady who was the subject of it, that I was under the necessity of removing it ; which I easily accomplished with a saw.

In that useful work, Cooper's Surgical Dictionary, an account is given of a case related by Mr. Abernethy, in his lectures, of a boy who came out of Cornwall, who was so excessively afflicted with an apparent predisposition to exostosis, or an exuberant deposition of bony matter, that a very trifling blow would occasion a bony swelling in any bone of his body. His ligamentum nuchæ was ossified, and prevented the motion of his neck ; the margins of the axilla were also ossified, so that he was as it were completely pinioned ; besides all this, the subject in question had numerous other exostoses in various parts of the body.

Of the fungous Exostosis of the medullary Membrane.

The object of this paper was more particularly to describe the simple cartilaginous exostosis, with the operations which might be undertaken for its removal; but in the dissection of exostoses, we found varieties, of which we judged it necessary to give some account, in order to prevent the performance of operations which could never be followed by a successful issue. We shall therefore first proceed to say something concerning the *fungous* exostosis of the medullary membrane.

This kind of exostosis is attended with the following symptoms. The disease begins in a general enlargement of the limb in the part opposite to the seat of the complaint, and to a considerable extent around it. It generally occurs in young persons, but I have known it to take place at fifty years of age. Its increase proceeds very gradually; and even when it has acquired considerable magnitude, although it produces some diminution of motion in the limb, yet it does not occasion pain, or prevent the patient from using it. When any pain does arise from this disease, it is of an obtuse kind, and is extended very much in the course of the bone and nerve, but becomes very acute whenever a nerve happens to be stretched by it, as in the exostosis of the thigh bone which presses on the sciatic nerve.

Symptoms
of medul-
lary exos-
tosis.

The general health is in these cases defective: paleness, debility, irregular state of the bowels,

Health of
the patient

mark the early stages ; and, when the disease is confirmed, a sallowness of complexion is observed ; the limb at length becomes of an enormous size at the diseased part, but the skin retains its natural colour ; the swelling feels hard in many parts of it ; but in others, it is elastic, yielding to the pressure of the finger, in such a manner, as to convey an idea of a fluid beneath ; but if an opening be made, no fluid issues, excepting blood.

Tubercles
on the sur-
face.

The surface of the tumor next becomes tuberculated, and these tubercles are tender to the touch ; they are also frequently slightly inflamed on their surfaces.

Constitu-
tional dis-
ease.

To these appearances succeeds constitutional irritation ; the rest becomes broken, the appetite impaired, and the bowels extremely irregular.

Ulceration
of the
tubercles.

During the continuance of these symptoms many weeks elapse, and, at length, ulceration takes place on the tubercles ; the skin secretes pus, but when the swelling itself becomes exposed, it discharges a bloody-coloured serum ; a fungus then arises, which occasionally bleeds, sometimes largely ; and, as usually happens in the fungous disease, the blood is loose in its coagulations, and separates a large quantity of serum ; the bleeding relieves the painful sensation, but for a very short time ; indeed, only for a few hours.

Sloughing.

The fungus projects considerably ; the skin yields very extensively, and at length sloughs take place, by means of which, considerable portions of the swelling are separated, and the disease becomes so far diminished in volume,

as to induce a hope of its ultimate complete destruction by gangrene; a hope, however, which, in this complaint in the bone, I have never seen realized. From the surface of the fungus, there generally occurs a very considerable discharge of serum, mixed occasionally with red particles, which moisten a great many folds of linen in a few hours.

Discharge
of serum.

Thus the occasional losses of blood, the immense discharge, but still more, the constitutional irritation, wear out at length the powers of the body; but the time occupied in destruction by these means, is sometimes two years, and at others is a much more protracted period, as from seven to ten years.

Duration of
the disease.

It often happens in this disease, that tumors of a similar kind form in other parts of the body during its progress; so also when the affected limb has been amputated, a similar disease will occur at a future period, and in organs of the greatest importance to life.

Similar
tumors in
other parts.

This disease originates from the medullary membrane of the bone within the cancelli, and if a circular incision be made of the limb, and the parts be observed, the following appearances present themselves. The skin is found in its natural state, excepting that it is projected by tubercles, which proceed from small masses on the surface of the tumor. In one case, in which ulceration had taken place, it was found that the ulcer extended all the way through the tumor to the bone. The muscles are removed to the distance of three inches or more from the surface of the bone, and form a thin layer over the tumor.

Dissection.

Appear-
ances on a
circular in-
cision.

Situation of
blood-ves-
sels and
nerves.

The large blood-vessels are next observed to be carried, as well as the muscles, to the vicinity of the surface of the limb—we have a curious specimen in the collection at Guy's, shewing this change in the situation of the vessels, in which the arteries have been injected—in the same manner the nerves are likewise removed from their natural seat.

Periosteum.

Under the muscles appears the periosteum, which is separated to different distances from the bone ; in some parts of the swelling to two or three inches.

The tumor next appears composed of lobulated masses of various colours, consistence, and materials. A part is yellow like fat, part a substance resembling brain, and a third part composed of coagulated blood, with interstices containing serum. In some parts the white substance is found firm, nearly as much so as cartilage, but in general it is of a more spongy appearance, and contains spicula of bone within it. The shell of the bone itself is in some parts absorbed, in others it is only thinner than usual ; in some cases it has been seen immensely expanded, so as to form a case like wire-work over the tumor (See Plate); in others it is only absorbed on one side by the pressure of the swelling. (See Plate.) In those instances in which fungous granulations arise from the medullary membrane, these are exceedingly vascular, very soft in their texture, secrete abundantly, and are sufficiently luxuriant to rise from the cavity of the bone considerably above the level of the skin.

With respect to the cause of the fungous medullary exostosis, nothing certain is known. In some instances it has been attributed to a blow ; in others to a jump from a very considerable height. Either of these causes, by disturbing the interior action of the bone, might produce the effect. In the lower jaw I have seen this disease arise from a decayed tooth. But when the exostosis proves of the fungous kind, it implies an unhealthy state of the constitution, giving rise to the unusual action which follows the injury.

In the treatment of this complaint, we have not only to combat the local disease, but likewise to effect a change in the constitution in which it occurs. When it has however produced any great changes of structure, or occasioned very considerable increase of parts, no medical means will suffice to restore them, or prevent the fatal tendency of the complaint. But in the commencement of any deep-seated disease in bone, the best medicine, so far as I have had opportunity of observing, is the oxymurias hydrargyri in small doses, given either in, or with, the decoct. sarsaparillæ compositum. This mercurial medicine, by reproducing the natural secretions of the body, and the sarsaparilla, by lessening its irritability, restore the general health, and will sometimes crush in its bud a disease, otherwise likely to become formidable, and at the same time prevent the formation of a similar affection in other structures.

The local treatment consists in the application of leeches, if there be pain, and of blisters,

Cause.

Treatment
in general.

taking care to keep up the discharge from their surfaces by means of equal parts of Ung. Hydr. and Ung. Sabin. Should the disease, however, after all, refuse to yield to these means, the patient is, by the constitutional remedies, rendered a better subject for the removal of the part by amputation or excision, which becomes then the only resource.

Tying the
artery.

I wished to try what would be the effect of cutting off the supply of blood in these cases of fungus, by tying the artery which supplies them. My colleague, Mr. Lucas, also made a similar trial; but the result of both cases shewed that such attempts will avail but little. They are therefore here mentioned, to deter others from making them.

CASE.

A young woman, aged 20, was admitted into Guy's Hospital, with a large fungous tumor growing upon the lower extremity of the radius. As it did not yield to any of the local or constitutional means which my mind could suggest, and she positively refused to submit to the operation of amputation, I proposed to her to ascertain what would be the result of cutting off the supply of blood to the tumor by tying the brachial artery, assuring her at the same time that it could not be followed by any prejudicial effect, even should it fail to produce a favourable influence. She readily submitted to this operation. A few days after its performance, a slough was produced upon the sur-

face of the fungus, by which its size was considerably reduced. But as the vigour of the circulation was restored by anastomosis, the original malignant nature of the disease again betrayed itself; the fungus grew to nearly its original size, and, after the expiration of a few months, destroyed her, as she still refused to submit to amputation. The operation which had been performed with the hope of giving her relief, produced but a very transitory influence upon the size of the swelling, and seemed neither to have retarded nor hastened her dissolution.

CASE.

Of this case I have preserved only the following notes in my case-book. The patient had a large fungus on the leg, which had not ulcerated. He refused to consent to the operation of amputation, but submitted to the proposal made to him of tying the femoral artery, which was done by Mr. Lucas on the 8th July, 1814. The measure of the limb was twenty-two inches at the time of the operation, and for four succeeding days, when it increased to twenty-four inches; and the outer part of the leg mortified upon the surface on which the limb rested. Amputation was performed on the 15th July, above the knee, but below the part at which the artery had been tied. Yet when the divided femoral artery was observed, the blood flowed from it *per saltum* on the tourniquet being loosened, and with such force, that he

Mr. Lucas's
case.

would soon have perished from hæmorrhage. The artery pulsated slightly when a ligature was made upon it; which circumstance shews how very easily the blood finds its course by anastomosis; as a week only had elapsed between the two operations.

It appears then from these operations that fungous diseases do not admit of removal from a diversion of the current of blood from its principal channel into the smaller arteries of the limb. The vigour of the circulation is for a moment lessened, but the peculiar action of the vessels does not appear to be ever suspended.

The operation of amputation after constitutional means have been employed, and the continuance of these constitutional means after the operation, hold out the chief hope of safety; for amputation without these will do no more than to avert the blow for a season. The following case, however, holds out a hope of benefit from an operation, which I have already proposed to the patient, and to which she has promised to consent.

CASE.

— Williams, a woman, aged 32, has frequently applied as an out-patient at Guy's Hospital during the present summer, on account of a fungous exostosis of the lower jaw, which forms a large prominence on the chin. It began six years ago in the teeth becoming loose, and falling out; when *fungi* arose from the al-

veolar cavities, which were of a purple colour, and after a time sloughed away ; the gum healed. The jaw then began to swell ; the *fungi* re-appeared after two years, and again sloughed. At this period a probe could be passed from the alveolar cavity through the jaw to the point of the chin. A large swelling at the symphysis then began to form, which grew gradually, with little pain, excepting some occasional shootings. Five weeks ago, the skin ulcerated at the chin. From this ulcer the fungus now projects, and two purple swellings appear upon the gum. She was of a delicate habit when young, always confined in her bowels, yet has twice bred during the existence of this swelling, and produced healthy children.

In this case, as there is no surrounding disease, the absorbent glands being healthy, and all the vital organs free from complaint, I have proposed to remove the portion of diseased jaw.

Of the Cartilaginous Exostosis of the Medullary Membrane.

There is an exostosis produced within the cancellated structure of the bone, arising from a diseased state of the medullary membrane, which differs greatly both in appearance and nature from the former.

In this case, the shell of the bone becomes extremely expanded, or rather the original shell is absorbed, and a new one deposited; and within

this ossific cavity thus produced, a very large mass of cartilage is formed, elastic, firm, and fibrous.

In its commencement, there is nothing of a malignant tendency. It arises from common inflammation, brought on in a constitution not unhealthy; but the irritation is kept up for a length of time, and a very extensive disease is thus produced. I cannot better illustrate this complaint, than by the introduction of the following cases.

CASE.

Sarah Dulwich, aged 13, in the year 1812, was admitted into Guy's Hospital with a very large osseous tumor on the chin, which first made its appearance twelve months before, in the form of a small tumor on the gum of the lower jaw. It was in its commencement unattended with pain. At the period of her admission, the upper surface of the tumor was globular, and occupied the whole of the left cheek; but beneath the integuments it was irregular, protruding below the jaw, and extending from the dens cuspidatus of the lower jaw of the right side irregularly under the tongue, which it thrust close to the right angle of the jaw; consequently rendering articulation difficult and indistinct. Internally, it was very irregular and hard, and had been superficially ulcerated from the pressure of the teeth of the upper jaw upon the left side during the last six months; but no fungus had arisen from the ulceration. Externally, it

reached from the chin on the fore part, passing up to the side of the left nostril, even to the edge of the orbit, round towards the ear, and was nearly half the size of the head. The skin in some places had a slight blush on it, and veins here and there of considerable size were seen running over its surface.

For five or six months, she has had severe pains in the left side of the head, and a suppuration from the right ear. Mastication is extremely difficult and painful, in consequence of the pressure of the teeth of the opposite jaw upon the tumor. On the left side, the upper jaw, together with the teeth, are pushed somewhat toward the opposite side from the pressure of the tumor. Her appetite is good, but her appearance altogether is delicate. She affirms, nevertheless, that her health had been generally good. Before the tumor appeared, she had been subject to the tooth-ach of the two molar teeth of the lower jaw constantly for two or three months.

The tumor continued to increase until it became of most enormous size, measuring five inches and a half from side to side, and four inches from the incisores teeth to its anterior projecting point. The circumference of the swelling was sixteen inches; and less than half of the tumor, after death, deprived of the integuments, measured seven inches and a half.

At length it pressed the epiglottis upon the rima glottidis, so as to occasion difficulty of breathing, and this source of irritation produced the destruction of life.

DISSECTION.—The tumor projected from the symphysis internally, and from the inner sides of the lower jaw backwards, more than three inches, occupying the space between the angles where the tongue was usually seated.

The tongue was thrust back into the throat, and to the right side, where it rested in a hollow, between the angle of the jaw and the tumor, extending only to the cuspidatus tooth; it was completely rounded. The epiglottis was bent down upon the rima glottidis, so as to produce great difficulty in breathing.

The tumor originated from the medullary membrane within the cancellated structure of the bone, and was composed of cartilage and bony spicula, but upon the surface consisted chiefly of a white, fibrous, elastic mass, resembling the elastic ligaments of the body.

The shell of the bone was entirely absorbed: the alveolar processes were greatly elongated, and bristled with bony spicula.

The external shell had numerous large holes in it. The incisores teeth were directed forwards, and the molares outwards.

The foramen in the jaw, for the transmission of its large nerve, was capable of receiving the extremity of the finger, so greatly was it enlarged.

The condyloid process was directed backwards instead of upwards, on account of the elongation of the jaw.

CASE.

Elizabeth Hall, aged 19, was admitted into Guy's Hospital on the 5th November, 1817. She says, that three years ago, while eating a crust of bread, she distinctly heard something snap, feeling at the same time a pain, on the right side of the lower jaw; she felt certain that it was not a tooth. Shortly after, a small immoveable tumor appeared about the centre of the jaw on the same side, which has since continued to increase gradually. She had previously had a decayed tooth, which was extracted about two years subsequent to the appearance of the swelling, without producing any effect either on the pain or increase of the tumor. On her admission, the swelling occupied the whole length of the side of the jaw from which it grew, from the angle to the symphysis; since that period it has rapidly increased, she thinks, from the frequent handling for the purpose of examination. The surface was very smooth and regular; centre considerably prominent, and on firm pressure in that part, the elastic parietes gave way, but immediately forced back the finger, as the pressure was discontinued, with a sudden jerk like parchment. She complained occasionally of lancinating pains in the tumor, particularly after its being handled. Her general health was good.

With regard to the cause of the disease above

Cause of
disease in
this case.

described, it was evidently the irritation of the decayed tooth, the fangs of which projected into the cartilage which was effused within the bony cavity, and which, instead of producing suppuration and ulceration, as it frequently does, kept up a degree of irritation, that did not pass beyond the stage of adhesive inflammation, and a cartilaginous deposit took place in the first instance, to which succeeded an ossific effusion.

I have seen a similar diseased state of the tibia, but am unacquainted with the circumstances of the case.

Treatment.

As to the treatment of this disease, it consists in first seeking the source of irritation, and removing it as soon as discovered, in order to prevent the further progress of the disease; and indeed it may be probable that the removal of the source of irritation might sometimes, even when the disease has advanced to a considerable extent, succeed in producing a cure, and therefore it is desirable to wait the event before any further operation is undertaken.

Source of
irritation to
be removed.

Removal
of the ex-
ostosis.

Should this however prove insufficient, it will be necessary that the external shell of the bone be removed by means of a saw, and that the cartilage which it contains be dislodged by an elevator. If the integuments be carefully preserved, little deformity follows; and thus by a simple operation, destruction, otherwise inevitable, is prevented.

Operation.

The operation performed, on the 21st of November, in the case of Elizabeth Hall, above

detailed, (page 189,) I shall here describe. An incision was carried from half an inch below the angle of the mouth, to the lower margin of the inferior maxilla, and continued along it to its angle. The flap was then dissected up, and a uniform tumor was exposed, of a hard consistence, composed of thickened periosteum upon the outer surface, and of a thin, bony, and elastic shell within it. The surface of this bony nest I with difficulty removed with a knife; and thus exposed a considerable bed of cartilage, occupying the place of the cancellated structure of the lower jaw, and expanding the remaining part of the jaw into a bulky swelling. The cartilage was removed from its bony nest by means of an elevator. The inferior maxillary nerve was seen crossing the side and bottom of the cavity, in its passage to the mental foramen.

It was necessary in the operation to avoid as much as possible inflicting any injury upon this nerve, as every time it was touched it produced considerable pain. In the course of the dissection, some hæmorrhage occurred, and several vessels were obliged to be tied. The flap was then brought over the cavity, and united by suture and adhesive plasters. The tumor, on examination, was found to consist of cartilaginous substance; but of a nature softer than that which is produced from the shell of bone*.

* In describing a bone, I divide it into its shell, or solid surface, and its cancellated structure.

The patient supported the operation extremely well. Some hæmorrhage took place after she was removed to bed, and she complained of great pain during the whole of the afternoon, in consequence of which an opiate was administered. She suffered some pain, and was extremely irritable during the three days after the operation ; but as soon as she could bear the extraction of the tooth, it was removed, and, on the 25th of November, the flap had in a great degree adhered, and she appeared to be suffering but little from the operation, although some discharge still continued.

Of periosteal Exostosis.

Fungous
periosteal.

Symptoms
similar to
fungous
medullary
disease.

This disease, like the preceding, is both of a fungous and cartilaginous kind. The former of these scarcely differs in its symptoms from the fungous exostosis of the medullary membrane, except that the general swelling of the limb is less, and the particular tumor is more prominent ; but there is the same want of sensibility in the commencement, with some pain afterwards ; the skin remains free from discolouration, and has a similar tuberculated appearance. Ulceration, bleeding, and sloughing, with great discharge ensue, and occasion the destruction of life, if some operation be not performed.

The following case will illustrate the history of this disease.

CASE.

A girl 19 years of age was admitted into Guy's Hospital for what was at first supposed to be an enlargement of the knee-joint, but upon more particular examination, it was discovered, that the swelling occupied the lower part of the os femoris, to which it was immoveably attached. The countenance of this girl was sallow, her general health appearing extremely defective. The swelling was small at her first admission, but during the time she was in the hospital, it rapidly increased; the skin was undiscoloured, and the surface of the tumor was tuberculated, hard as bone in some parts, but elastic in others. It was at first entirely unattended with pain; but as it increased it became occasionally extremely painful, and evidently re-acted upon her constitution in such a manner as to threaten her life, unless the operation of amputation should be had recourse to. The limb was consequently removed. Violent constitutional irritation succeeded to the operation, which for several days excited an apprehension for her life.

Case of this disease in the os femoris.

Appearance and health of the patient.

Amputation.

When these symptoms subsided, the stump put on an unhealthy appearance. Its irritability was excessive, so that she dreaded extremely the approach of her medical attendants for the purpose of changing the local applications. A fungus arose from the cancellated structure of the bone, which it was necessary to

destroy with caustic. Many weeks elapsed before the closing of the stump, notwithstanding a sufficient quantity of integuments had been preserved. And indeed, at length, when she was discharged from the hospital, some slight ulceration of its surface was still remaining: but it was thought adviseable that she should have the advantage of a more salubrious air than that of an hospital in a large town.

Dissection.

DISSECTION.—The exostosis was seated at the lower part of the femur; the periosteum passed over it, and adhered strongly to its surface. The tumor itself was very firmly fixed to the external surface of the shell of the bone. It was injected minutely with size. In some parts it appeared extremely red from the injection; in others, where the injection would not enter, it was white, so that it was found very vascular in some parts, and in others not at all so. The surface of the tumor was lobulated. The periosteum at one part appeared to have formed, upon its external surface, a tumor composed of similar materials to that which was seated between it and the bone.

Dissection.

Such swellings generally are found on dissection covered with a thickened periosteum, within which a white elastic substance is discovered, having numerous small spicula of bone passing in radii from the surface of the original bone; the shell of the bone is in a great part remaining: I have seen this however in some places removed by absorption. Within the cancellated structure, there appears in some instances to have existed a slight inflamma-

tion, for in the cancelli I have seen small portions of ossific matter deposited.

I made a section of a tibia, on which a large exostosis of this kind was placed; one half of it I immersed in diluted muriatic acid, and found that when the phosphate of lime was removed, that the swelling remained of its former size, and that a bed of cartilage had supported the bony deposit. (See Plate.) The shell of the bone, in the remaining portion of the section, continued entire; spicula of bone in radii, passed from the shell of the bone to the periosteum, whilst in the cancellated structure, opposite to the seat of the exostosis, a very slight deposit of bone in small nodules had taken place. What structures preceded the formation of the cartilage, I do not know; but Mr. Howship, in an ingenious paper which he has published in the *Medico-Chirurgical Transactions*, on the growth of bone, has shewn, that a membranous structure precedes the formation of cartilage and the deposit of ossific matter in the ordinary formation of bone.

We have in the collection at St. Thomas's, a considerable number of specimens of exostoses, chiefly seated upon the lower part of the os femoris, and the upper portion of the tibia. Those which have been macerated, exhibit appearances similar to that which I have just described, in which a section had been made; but those which have been preserved moist, in which the soft parts have not been destroyed by putrefaction, present the following marks. The periosteum thickened passes over the sur-

Section of
a tibia.

Appear-
ances of
moist pre-
parations.

face of the swelling, to which it firmly adheres. The tumor itself occupies a great extent of surface between the shell of the bone and the internal surface of the periosteum. The swelling is lobulated: the greater part of it is composed of a white substance, somewhat elastic, but not so firm as common cartilage: part of it is coloured by blood, and the texture of this part is softer than the rest. When injected it shews a very unequal vascularity; being in some parts rendered extremely red by the injection, and in others remaining white; and this I have observed to be the case with fungous swellings generally, that they are only partially organized. In their incipient state, spicula of bone have not yet been formed in them; but in proportion to their extent and duration the ossific process occurs, though the spicula are smaller and less numerous than in the cartilaginous exostosis. In one specimen, it appears that a small portion of this fungous substance is thrown out upon the external surface of the periosteum. The medullary membrane and cancellated structure of the bone in these specimens, have not undergone a similar change to that which has taken place upon the external surface: but in one of the specimens, there are distinct marks of inflammation in the medullary membrane, and in another, this membrane is beginning to participate in the disease. The surface of the exostosis viewed by the microscope exhibits numerous vascular pores.

Causes.

This disease is attributed to accident; but

any irritation upon a bone in an unhealthy constitution will produce it. We have a very fine specimen of it in the collection of Guy's Hospital arising from an internal exfoliation of the os femoris: between the periosteum and the bone, in this case, instead of the cartilaginous process which accompanies internal exfoliation, an immense fungus is thrown out between the periosteum and the surface of the bone, shewing that the nature of the inflammation is determined by the state of the constitution at the moment, and that a very unusual and malignant effect may be produced by a frequent cause of irritation.

Internal
exfoliation.

The treatment of this complaint is similar to that required in the fungous exostosis arising from the medullary membrane; but it is only in the first dawn of the disease that we are to entertain any hope of a benign influence from medicine. It would be dishonest to assert that we have a knowledge at present of any medicine having a specific influence over cancer or fungus. We may indeed improve the constitution a little, and keep the disease at bay; but once formed, it proceeds more or less rapidly to its fatal termination, unless prevented by the operation of amputation or excision; which the state of the constitution improved by medicine will render more safe at the moment, and hold out a better grounded hope for the future.

Treatment
the same
as in the
disease of
the medul-
lary mem-
brane.

No remedy
for fungus
or cancer
yet known.

Of the cartilaginous Exostosis between the Periosteum and the Bone.

Cartilaginous exostosis of the periosteum.

Admits of cure from surgery.

Arises from inflammation.

Appearances on dissection.

This is a very different affection to the preceding, and more deserving the attention of the surgeon, since it admits of relief by operation, though sometimes with the loss of the affected limb. It originates in the inflammation of the periosteum and of the corresponding part of the bone; and a deposition of cartilage, of very firm texture, and similar to that which forms the nidus of bone in the young subject, adheres to both these surfaces. The periosteum adheres to the external surface of the swelling, and the swelling itself is attached still more strongly to the surface of the bone. Within this cartilage a bony matter is deposited, which is first thrown out from the original bone; it continues afterwards to be secreted as the cartilage increases in bulk; for it appears that between the periosteum and bony mass, cartilage is constantly secreted, which constitutes the exterior surface of this tumor. Thus, on dissection, we discover, 1st, The periosteum thicker than natural; 2nd, the cartilage immediately below the periosteum; and, 3d, ossific matter deposited within the cartilage, extending from the shell of the bone nearly to the internal surface of the periosteum, still leaving on the surface of the swelling a thin portion of cartilage unossified.

When the accretion of these swellings ceases, and the disease has been of long standing, they are found to consist, on their exterior surface,

of a shell of osseous matter, similar to that of the original bone of the same cancellated structure, and communicating with the original cancelli of the bone. (See Plate.) Consequently when an exostosis has been formed in the manner here described, the shell of the original bone becomes absorbed, and cancelli are deposited in its place. In the mean time the outer surface of the exostosis acquires a shell resembling that of the bone itself. When the exostosis has been steeped in an acid, and by this means deprived of its phosphate of lime, the cartilaginous structure remains of the same form and magnitude as the diseased deposit; and as far as I have been able to discover, it is effused precisely in the same manner as healthy bone. From which it appears, that the formation of these excrescences differs in no respect from that of original bone, since they are composed of cartilage for their basis, and of an earthy salt to impart to them firmness and solidity; a circumstance which I have shewn for many years in my lectures.

Are formed in the same manner as healthy bone.

For the most part these diseases are attended with very little pain, and, especially at their commencement, are but little complained of: when, however, they have acquired some considerable bulk, they do not fail to occasion painful sensations by their pressure upon the surrounding parts; very considerable inconvenience likewise frequently arises to the patients from the impediment and interruption they present to the action of muscles, the tendons of which are sometimes detained by means of them

Not painful at first.

Inconvenience from interrupting the motion of muscles and tendons.

Skin some-
times
ulcerated.

in particular positions, at other times they glide suddenly over them, attended by a snapping noise which can be distinctly heard by the bystanders, and occasioning by these means painful and unpleasant sensations. Others again produce considerable pain in the limbs when the tumor advances to the surface of the skin. I have seen instances of its being ulcerated from this circumstance, but the sore exhibited no signs of malignancy, as will be seen in a case which I shall presently relate, in which the ulcer formed on the surface of the skin had not an unhealthy character. We have also a preparation of exostosis upon the radius, in which the diseased growth is exposed by common ulceration.

Most fre-
quently oc-
curs on the
os femoris.

The most frequent seat of the periosteal exostosis is upon the inner side of the os femoris just above the internal condyle, and in the direction of the insertion of the triceps muscles. In this situation I have seen several instances of it. (See Plate.) I have also seen it seated on the tibia, immediately under the insertion of the sartorius and gracilis muscles. A considerable enlargement of the bone is occasionally produced upon the fibula, at its connection with the tibia; it seldom however in that situation rises into any thing like a circumscribed exostosis. After long continued courses of mercury, when the patient has been debilitated to an extreme degree, if he exert himself much in walking, not only is this thickening of the bone of the fibula produced, but a suppurative process is instituted, which is followed by exfoliation, and

Sometimes
on the
tibia.

lays the foundation of a very tedious, and sometimes of a dangerous disease.

At the insertion of the deltoid muscle in the os humeri, I have also seen this disease occur.

The periosteal exostosis occupies either a very small portion of the bone, or is extended over a considerable surface, sometimes nearly its whole circumference, sometimes several inches of its length. The following case, extracted from the Medico-Chirurgical Transactions, forms a circumstantial detail of its history, when it is of great magnitude.

CASE.

“ Catharine Coulson, aged 30 years, unmarried, was admitted into Guy’s Hospital, under the care of Mr. Astley Cooper, Nov. 29, 1809, on account of a firm equable and immoveable tumor situated at the upper and external part of the left arm, so high up, that on a superficial inspection, it seemed to be connected, not only with the humerus itself, but also with the clavicle and scapula, rendering it probable that it had an attachment to the glenoid cavity of the latter bone. The arm, however, could be moved forwards and backwards; but in consequence of the weight of the tumor, and the great attenuation, and perhaps complete obliteration of part of the deltoid muscle, produced by its pressure, the voluntary motion upwards was lost. On minute examination it was ascertained, that this enlargement arose from the superior part of the humerus; but as symptoms of inflamma-

tion of the shoulder-joint were present, a doubt still remains, whether the morbid action, which caused its formation, had commenced in those portions of bone, which entered into the composition of that part. That the humerus itself was diseased, seemed evident, from an obvious enlargement and irregularity, felt at its inner part, commencing high up in the axilla, and ending about four inches from that point. The circumference of the tumor, at its most bulging part (the admeasurement being taken parallel with the arm) was $25\frac{3}{8}$ inches; and a line carried round its most prominent part, so as to surround both it and the arm, measured $24\frac{1}{8}$ inches.

This swelling was in general covered merely by common integuments; it was extremely painful when handled, and the skin over it felt much hotter than natural; upon it many large veins were ramified. Motion of the arm gave considerable pain, which was referred both to the tumor and shoulder-joint; and the patient complained much of the weight she had to support. Her appetite was impaired, and she had some degree of fever.

After her admission, the account collected of the commencement and progress of this disease, was the following: about three years and a half previously, after having once struck the summit of the shoulder forcibly against a wall, afterwards fallen on it, and repeatedly received blows on the same part in mangling, she observed a firm tumor, about the size of a nutmeg, at the superior part of the arm. Subsequently

to this, she was always affected with pain about the shoulder when employing the limb freely. The enlargement gradually increased; and about two years and a half before, when it was equal in size to a common tea-cup, she was admitted into Guy's Hospital by Mr. Cooper. She remained under his care six weeks, during which time, repeated blisters were had recourse to without benefit. In about six months, she again applied for admission, and was re-admitted under Mr. Cooper. The tumor had then attained the size of a pint bason; and the motion of the arm had become less free than on the former occasion, though not so considerable as to prevent the general use of the limb. For this reason, and because her constitution had suffered little, she would by no means consent to the operation of amputation at the shoulder-joint, the necessity of which was strongly urged; and at the expiration of eleven months, she quitted the Hospital. Within the year and half antecedent to her last admission, the augmentation of the tumor had been very rapid; but she did not notice the enlargement mentioned, to have been observed in the humerus itself, till six or seven weeks previously. Although her nights had been long restless, her general health continued good till the 26th of November, when she was attacked with severe pain in the tumor (which felt hot) and about the shoulder, with loss of appetite and languor.

From the period of admission to the 8th December, blood-letting from the veins over the tumor was twice employed, which dimi-

nished the pain and tenderness : the blood was sizy.

As the patient's arm had now become useless, and her sufferings, both from the weight, and the symptoms under which she laboured were very great, she was prevailed on, without much difficulty, to undergo an operation, which was speedily concluded on, and performed on the 8th of December. The state of the deltoid muscle before mentioned, prevented the possibility of executing it in the manner usually directed; for no flap, except of the common integuments, could have been preserved. It was concluded, therefore, that the most advisable plan would be to aim at covering the wound with those portions of integument and muscles, which anteriorly and posteriorly connected the arm to the trunk of the body.

The first step of the operation, was to secure the artery. An incision therefore was made in its direction, high up in the axilla, two ligatures put on it, and secured; when a division was made between them. The application of a ligature on the part of the artery most distant from the heart, was to prevent the possibility of any hæmorrhage from such anastomosing vessels as empty themselves into it. An incision was next commenced, immediately anterior to the acromion process of the scapula brought forwards, and ended in the axilla, passing just below the end of the artery on which the ligature had been applied; and another was carried from the same point posteriorly, and made to meet the former one.

The next part of the operation consisted in the gradual division of the muscles surrounding the joint, and the application of ligatures to such vessels as it appeared at all probable might furnish free hæmorrhage. These, being numerous and large, in consequence of the great size of the tumor, it became necessary to secure ten arteries. As a further precaution also against any bleeding which might have taken place, either from returning vessels, owing to the circulation kept up by undivided branches of arteries, or from regurgitation, the veins accompanying the axillary and posterior circumflex arteries were tied by two ligatures each, and divided at the intervening space. The capsular ligament being at length laid bare, an incision was made into it, and the cavity of the joint exposed, which was filled with coagulable lymph, of a reddish colour, and gelatinous consistence, mixed with some serum or synovia. The arm being removed, the glenoid cavity was accurately examined, and presented no mark of disease: the internal surface of the capsular ligament was more vascular than natural, but the articulating surfaces were not destroyed. The cartilage was pared from the glenoid cavity, in order to facilitate the process of granulation; and after all hæmorrhage was stopped, the integuments were brought together, and secured in apposition, by three sutures and straps."

It is not necessary here to detail the circumstances of the case subsequent to the operation,

they have already been described at length in the Second Volume of the Medico-Chirurgical Transactions.

The wound was cicatrized about the 18th of April, but the patient still remained impressed with the idea of having the arm, and that she could move the fingers. Attempts, however, at such motions, were always attended with pain and sense of pricking of the whole extremity; which, as before, when she is in the recumbent posture, feels to be placed over the breast, but when erect, it appears to be placed posteriorly.

Dissection of the Tumor.

The weight of the tumor, including that of the os humeri, was eleven pounds.

The periosteum, in a considerably thickened state, covered the surface of the swelling.

The principal part of the tumor was composed of cartilage, which adhered firmly to the external surface of the bone, and to the inner side of the periosteum.

The bone was much increased in its diameter. Where the tumor was attached to it, numerous processes of bone passed into the cartilaginous matter.

The cancellated structure of the bone was obliterated opposite the disease, and a red pulpy mass was found in the cancelli, at that part at which the otherwise healthy bone joined the diseased.

I have lately examined the preparation made from this case with considerable care, and on making a section of the os humeri, found it spread into a large and very solid bony mass at least three times its natural size. Its cancellated structure nearly obliterated by cartilaginous and ossific deposit. The bone towards the axilla is less extended than that part which is covered by the deltoid muscle. On the outer side of the enlarged humerus, there is an immense mass of cartilage, in which numerous ossific depositions have taken place. The periosteum covers the swelling, and adheres firmly to its external surface: the swelling is composed of one third bone and two thirds cartilage, with bony masses intermixed. There is also in the collection at St. Thomas's Hospital a very fine preparation of this disease, made by Mr. South, from a patient whose leg was amputated by Mr. Chandler.

With respect to the cause of the periosteal exostosis, which has but a small base, and which follows the course of the tendons or ligaments, as that in the direction of the triceps femoris and gracilis, I am of opinion that it arises from exertions disproportionate to the strength of the subject. The tendons which are fixed in the bone becoming sprained by over exertion, inflammation is excited in them, which is thence communicated to the periosteum and bone, and a deposition is consequently produced in the direction of the tendons sprained and inflamed, upon which the weight of the body is more

Causes.

particularly thrown. We see also in horses that the disease denominated *splent* is produced by sprains of the ligaments. This disease is exostosis. The same effect also is produced in the human subject by a sprain of the ligament which connects the fibula with the tibia. Those who are attentive in observing disease must have seen enlargements of the fibula at its lower part, frequently succeeding considerable exertions in walking, pending, or immediately succeeding to a long continued course of mercury, as I have already observed.

Blows also occasionally produce this disease : I have known an enlargement of the tubercle of the tibia, produced by a fall upon the knee, continue for many years. I have seen likewise an exostosis of the metacarpal bone of the little finger occasioned by a sharp blow.

Exostosis
from pres-
sure.

Pressure is also sometimes a cause of exostosis : Mr. Cline, Mr. Hutchinson, and myself, were consulted respecting a tumor of this kind, upon the symphysis of the lower jaw, which owed its origin to a considerable degree of pressure long applied to the chin.

Treatment.

The periosteal exostosis admits of remedy, from internal medicine, from external applications, and when considerably advanced, from surgical operation. The internal and local treatment of these cases differs in no respect from that which we have already given, when speaking of the medullary exostosis. The common alterative plan of small doses of mercury, with decoction of sarsaparilla, combined with stimu-

Similar to
that of me-
dullary
exostosis.

Oxymur.
hydr. cum,
decoct.
sarsap.

lating plasters, as the emplastrum ammoniaci cum hydrargyro, with the view of promoting absorption of that which has been effused, by its stimulating qualities and by its pressure, are the means which are generally adopted. But in this instance, as in the former, my experience does not furnish me with an example of such remedies having any influence, except in the very commencement of the disease; and too often the insensibility of these swellings prevents their being discovered until they have acquired some magnitude.

When these tumors have become of considerable bulk, they sometimes remain stationary and produce no inconvenience: but at others, they continue to grow, occasion considerable pressure upon the surrounding soft parts, interfere with their motions, and render an operation necessary. I have known a gentleman who had an exostosis upon the inner part of the thigh bone, suffer great inconvenience from it in riding, and he was under the necessity of having a leather pad contrived to wear upon the inner side of his knee, to prevent the pressure of the saddle upon the unnatural growth of bone.

The operation for their removal is performed by means of a saw, and may be effected with comparatively little pain to the patient, and generally, I believe, without any danger, if the nature of the disease be well discriminated, by distinguishing the fungous from the cartilaginous swelling.

Operation.

Mr. Machell's saw.

Mr. Machell, surgeon, Rider-street, St. James's, has invented a saw which answers the purpose of sawing to a great depth exceedingly well, by which the operation is much facilitated, as this instrument admits of being applied amongst the muscles without doing them any injury. The form of this saw will be best explained by consulting the annexed plate. I have had the position of the handle altered in order to enable me to support and apply it more easily, but in every other respect the instrument is delineated precisely according to his invention. Beside the saw, it will be necessary for the surgeon to be provided with a strong pair of nippers for the purpose of removing any irregular fragments of bone that may remain after the exostosis has been removed. The highly ingenious instrument of Dr. Jeffries of Glasgow, called the chain saw, may also be sometimes employed with considerable advantage.

The following cases will serve better to illustrate this operation than any separate detail of the operation itself.

CASE.

Sarah Hait, aged 48, was admitted into Guy's Hospital, 25th June, 1800, under the care of Mr. William Cooper, at that time surgeon to this hospital. She was the subject of a large exostosis which grew out of the anterior part of the tibia. When I succeeded to the

surgeoncy of that hospital, she became my patient, and was the first person on whom I performed any operation in that institution. In answer to my inquiries respecting the first appearance of this tumor, she stated that it had begun in her childhood, and had now existed forty-four years. It had acquired the magnitude which I have endeavoured to express in the plate subjoined to this paper, but was of the form of an inverted pyramid, the apex being attached to the tibia, and considerably narrower than the base, which constituted the surface of the exostosis. A small ulcer was seated on its external surface. It was not, nor indeed had it ever at any time been extremely painful, and what little pain she had suffered was of the obtuse kind. As the ulcer above mentioned rendered her apprehensive of ill consequences, and I had represented to her that she could not hope to obtain relief from any other means than that of sawing off the tumor, she readily submitted to the operation.

I made an elliptical incision through the in- Operation.
teguments, preserving enough of them to cover again the surface of the tibia after the exostosis should have been removed. When the skin was turned back sufficiently to expose to view the surface of the original bone, I attempted to saw through the exostosis by means of a small metacarpal saw, but found the structure of the tumor of too solid a nature to admit of an impression being made upon it by that instrument; I was consequently obliged to have recourse to

the common amputating saw in order to effect my purpose, sawing first in a direction from the upper part of the tibia, and then from the lower part, so as to make the section meet in the centre, and in this manner the exostosis was readily detached.

Little blood was lost during the operation, nor did the patient suffer much pain. I endeavoured by approximating the integuments to unite the wound by adhesion, but did not succeed. Granulations of a very healthy nature arose from the surface of the wound, and six weeks after the operation, two small portions of bone exfoliated; the patient not only recovered from the operation, but regained also the perfect use of the limb.

CASE.

The result of the foregoing case gratified me exceedingly; for I felt a hope that exostosis, when seated on any accessible part of the body, might be safely removed by an operation similar to that before described: but I have a case now to relate which proved by no means so fortunate in its result. This case, however, was of the fungous and not of the cartilaginous kind. A man who lived near to me when I resided in the city, had a large tumor growing out of his forehead. Anxious to examine it, I called upon him, and found him labouring under a swelling of the magnitude, when compared to the size of the head, of that

represented in the plate. It had been growing several years, the skin over it exhibited a blush of inflammation. Its fixed state, and the firmness it presented to the touch, convinced me that it was exostosis; yet at the same time it was less resisting and more vascular than the cartilaginous exostosis usually is. I related to the patient the case above given, stated to him its favourable result, and advised him to become a patient in the hospital, where he might undergo a similar operation; as, without it, I conceived that the disease must necessarily prove fatal. To my advice he readily assented, and submitted to the operation I had recommended to him a few days after his admission into the hospital. I began by making an incision through the integuments directly over the tumor, from the surface of which there issued a very considerable quantity of blood. I continued to turn aside the integuments until I reached the surface of the cranium, and then with a metacarpal saw, succeeded in cutting through a substance much softer than common cartilage, containing numerous but slender spicula of bone within it. Each part of the swelling bled freely; but on bringing the integuments over the surface, and making use of pressure upon them, the bleeding from the bone was stopped, and it was only necessary to secure a few vessels of the integuments. Upon examination of the removed tumor, it appeared softer than cartilage, although it contained

some osseous spicula, and I was able readily to break it down with my finger.

On the following day the patient had a considerable degree of fever, which continued to increase until the fourth day, when he became comatose, and on the sixth day he died. Upon examination of the body I found that the swelling occupied the internal as well as the external table of the cranium; it extended through both, and affected the dura mater which had several fungous projections proceeding from it; and that the inflammation which had been excited by the operation, had extended to the membranes of the brain opposite to the part where the disease had been seated.

This complaint seems to have originated in the diploë of the os frontis, and to have produced an effusion both between the pericranium and the skull, and between the skull and the dura mater. The swelling upon the outer part of the head, was, however, much larger than that which had arisen from the inner table. It was evident, too, that this case must ultimately, and at no distant period, have proved fatal, if no operation had been performed.

An exostosis on the external table of the skull, growing slowly, very little vascular, unattended with any considerable pain, may safely be rendered the subject of an operation; but a swelling of more rapid growth, red upon its surface, shewing signs of considerable vascularity, and attended with great pain shooting through the brain, is one for which I should now hesitate to perform an operation.

CASE.

Miss E. O. 11 years of age, was brought to my house in July 1817, by Mr. Prior, Surgeon of Clapham, on account of having an exostosis on the thigh bone: it was seated a little above the inner condyle of the os femoris in the line of the insertion of the triceps muscle. The account she gave me was, that it was accidentally discovered about eight months before she applied to me. At first, it did not interfere with her daily exercises, and it produced no pain on walking; but from the month of May last she found some difficulty in bending the limb. Mr. Mortimer, Surgeon, of Bristol, wrote to me, that he was requested to examine Miss E. O.'s thigh in the beginning of the year, and found a small tumor about two inches above the inner condyle of the femur, directly under the seat of the garter. This tumor was evidently an osseous enlargement, insensible to pressure, and by no means painful. The skin was perfectly free from inflammation, and there was no reason to suppose that the tumor had acquired any addition to its bulk for years. Its origin was unknown; it occasioned no pain or inconvenience whatever, nor did it in any way impede her walking or dancing, or produce any degree of lameness. Mr. Mortimer's view of the case was perfectly correct. In the month of May last she first found that on going up stairs, she was under the necessity of advancing her right foot on each

stair; and the same in descending, when she was obliged to proceed sideways, being unable, without great inconvenience, to bend the limb. Whilst sitting down, and more especially on a low seat, she felt considerable pain in bending the knee: and after having sat for some time, she experienced pain and difficulty on rising. Her lameness, just before her journey to London, had considerably increased, and her leg had become painful down to the heel. When she attempted to run, she felt a snap upon the swelling, as if a cord had slipped out of its pulley, which was owing to the tendon gliding over the projecting part of the bone.

On Monday, the 21st of July, an operation was performed for the purpose of removing the swelling, in the presence of Mr. Prior and Mr. Plowman. An incision was made over the projecting portion of the bone, and the muscles drawn aside from its surface: the periosteum, which was much thicker than usual, was divided by the knife, and turned aside from the exostosis, which was covered by a bed of cartilage, in which bony matter had not yet been deposited; and this was about the thickness of $\frac{1}{8}$ of an inch. The exostosis was next cleared of the soft parts from the surface of the thigh bone upon which it grew, and a spatula was passed down to confine the muscles from interfering with the saw. The saw was then attempted to be used without the forceps, but it could not be well fixed: the forceps were therefore added to it, and the bone was sawn through. Some irregularity remained upon the thigh bone,

which I endeavoured to remove by means of a saw recommended by Mr. Hey, but the muscles interfered with its employment, in consequence of the depth at which the bone was seated; and I removed it readily, by means of a pair of bone nippers.

No vessel of any importance was wounded in this operation, nor was there any necessity for applying a ligature. The edges of the wound were approximated, and retained, by means of adhesive plasters; and an evaporating lotion was applied.

On the 22nd she had some fever, which on the 23d had subsided.

On the 24th she was carried to the sofa, after which she experienced no further inconvenience from the operation; and before leaving town had entirely lost the painful sensations which had previously existed.

CASE.

James Aris was admitted into Guy's Hospital, August 13, 1817, with an exostosis occupying from one to three inches of the thigh bone, above its internal condyle, which felt, through the integuments and muscles, about the size of the finger, and which was directed rather upwards, not being exactly at right angles with the thigh bone. His age was 24 years; and 14 years ago, while jumping over a post, he first discovered pain in the part which afterwards formed the seat of the disease. The pain lasted but a very short time, but it led

him to examine particularly the part, when he perceived a small and hard swelling. This tumor gradually increased, and at length began to interfere with the motion of the limb, so as to render him anxious to have advice respecting it. When walking, he felt what he described as a snapping in the part, like a cord slipping from a pulley, which probably arose from the extension of the sartorius muscle, and its sudden slipping over the swelling. When he placed the limb quite straight, he found a difficulty in bending it; and when bent it was almost equally difficult to extend it: each flexion and extension producing a snapping noise, which could be distinctly heard.

On considering the inconvenience which the swelling had produced, and that the disease was obviously on the increase, I recommended to him the operation which I had performed in the preceding Case, and advised him to become a patient in the Hospital, and to submit to one of a similar kind. He procured admission immediately.

On the 22nd of August I performed the operation. The man was lying upon a table, with his thigh slightly bent, and I made an incision through the integuments over the swelling, and thus exposed the sartorius muscle, which appeared to have gained an increase in its breadth, and to be incapable of being sufficiently drawn aside to completely expose the tumor without considerable violence; I therefore made an incision through it in the direction of its fibres, sufficiently large to allow the exostosis to pass through the opening. The peri-

osteum which covered the swelling, was then exposed, and being cut through, and turned aside, a surface of cartilage was laid bare, and beneath it a large process of bone. Mr. Machell, the inventor of the saw, who was present at the operation, himself applied it, and with a very few turns of it removed the osseous tumor. The edges of the wound were brought together, and union attempted by adhesion.

In the evening of that day he had some symptoms of constitutional irritation, and some blood was taken from his arm. On the following day, he took a brisk purging medicine, and after this time no unpleasant symptoms appeared.

My dresser, Mr. Humble, informed me that the wound was as nearly as possible cicatrized on the 12th of September, and he was discharged from the Hospital a few days afterwards, and continues free from the inconveniences which he had experienced prior to the operation.

CASE.

Mr. George Alston, aged 18, about four years ago perceived a small tumor on the outer part of the fibula, an inch and half below its head, which continued to increase for two years, till it attained the size of a large chesnut : in twelve months after its first appearance, the fibular nerve became affected from the pressure of the tumor, producing uneasy sensations on the surface of the toes, and paralyzing the peroneal

muscles, the flexors of the foot, and extensors of the toes. The tumor had been free from pain, and for the last two years stationary. I was consulted respecting this case, and as the patient had been under the judicious care of Mr. Harold of Nayland, without any diminution of the disease, I advised an operation, which was performed by Mr. Living in the following manner on the 19th of January. A crucial incision through the integuments having laid bare the tumor, the fibular nerve was found passing through its centre, which was divided; and the neck of the tumor being very short, Hey's saw was employed in preference to the circular. The wound was not completely healed until the end of four weeks, having been somewhat retarded by an irregular state of the bowels. On the nerve being divided in the operation, the pain in his toes immediately ceased, but the diminished action of the muscles on the anterior and outer part of the leg, still continues (April 16th); yet he is enabled to pursue his profession without any material inconvenience.

CASE.

H. W. Bronner, a German gentleman, 21 years of age, in the year 1813 first perceived a tumor on the os pubis on the left side, about an inch from the symphysis; its size being then about that of a filbert. In two years it had acquired twice its former magnitude. In 1816 the patient came to England, and at the end of this year the swelling greatly increased, when he

began to feel pain in the left leg. Not speaking the English language fluently, he neglected applying to any professional person. In 1817, the pain still augmented, and though not violent, was exhausting him by continued irritation. It was particularly felt immediately above and below the knee, very slightly in the hip, and it sometimes extended to the foot. In the month of January he applied to me, and I found the disease was a large exostosis on the pubes. On the 13th of March he submitted to have the tumor removed, which was in part effected by Macchell's saw and in part by Hey's. On the 10th of April the wound was healed, and on the 22d he was able to walk two miles without suffering pain or complaining of any inconvenience, excepting that the skin felt tightly bound down upon the bone.

It appears then, that bones, after operations, unite by adhesion to the soft parts; if adhesion cannot be produced, healthy granulations arise from the surface of the bone, and cicatrization takes place upon these, as upon other parts of the body; and that there is reason to believe, that these structures may, with properly constructed instruments, become much more the subjects of operations, than they have hitherto been considered.

Fig. 6.



Fig. 7.

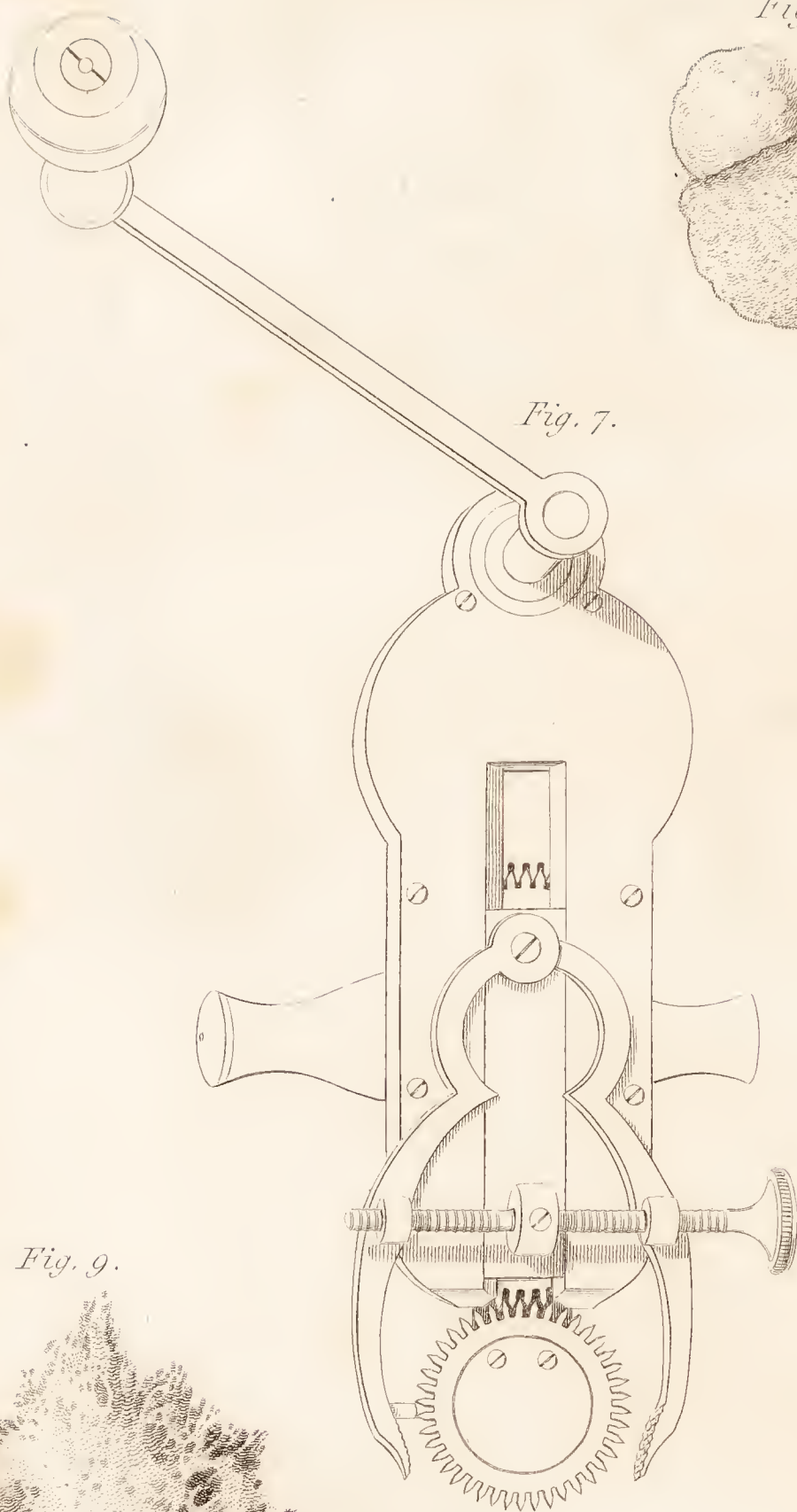


Fig. 9.

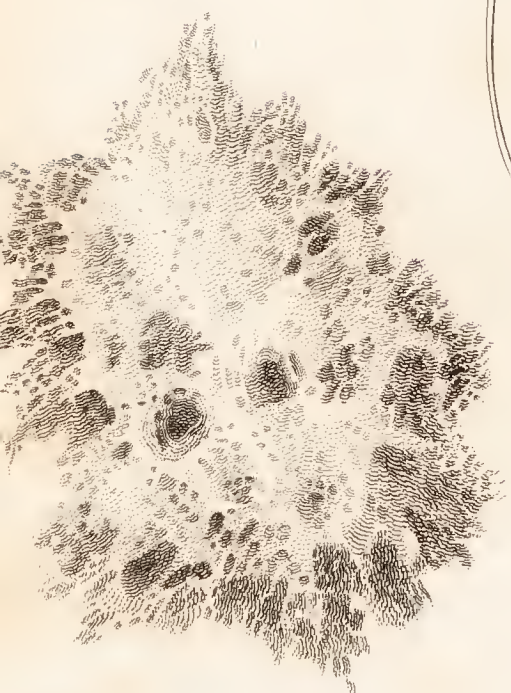


Fig. 8.

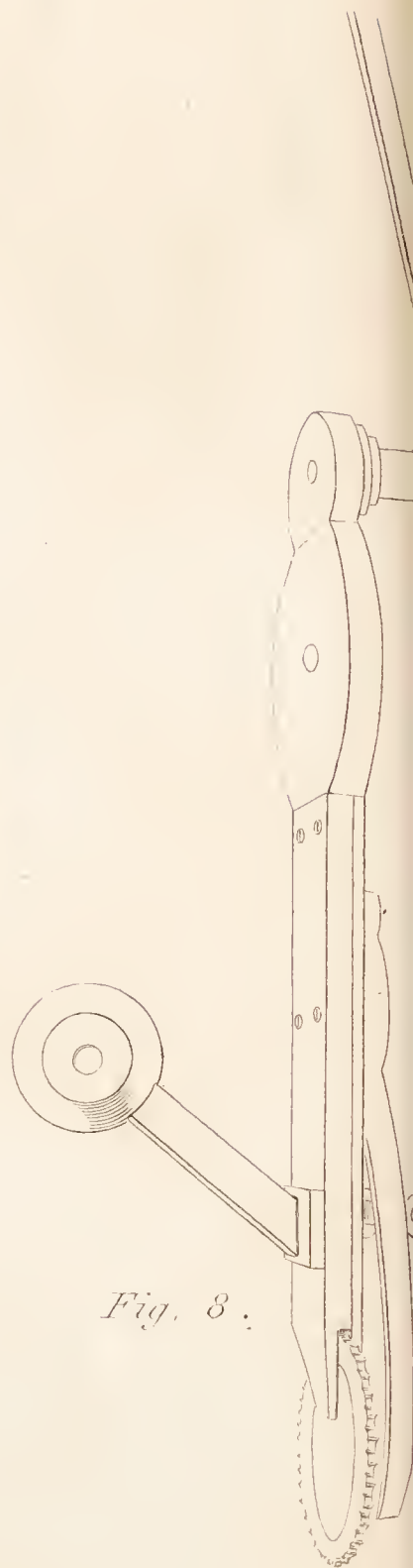


Fig. 4.



Fig. 2.



Fig. 3.



Fig. 1.



PLATE VIII.

- Fig. 1.* Shews the relative size of an exostosis of the leg of a woman, successfully removed. See Case.
- Fig. 2.* The os femoris, with an exostosis growing from it, in the most frequent seat of that disease.
- Fig. 3.* The section of an exostosis, which had become stationary, a shell formed upon its surface like that of the original bone, the original shell absorbed, and a cancellated structure seen passing into the exostosis.
- Fig. 4.* A view of the head of a man who had a large fungous exostosis, which was unsuccessfully removed. See Case.
- Fig. 5.* View of an exostosis removed by the saw, in one of the Cases which I have described; its surface was covered by cartilage; its interior was of bone; I put this exostosis in a diluted muriatic acid; and having removed the ossific matter, found in every part of it a bed of cartilage.
- Fig. 6.* Exostosis removed from Aris; its extremity formed a cartilaginous ball. See Case.
- Fig. 7.* Machell's saw. The forceps on the sides of the saw, by which the bone is held, regulated by a screw, a winch turns the saw by concealed wheels.
- Fig. 8.* A lateral view of the saw.
- Fig. 9.* A portion of a large exostosis, shewing its cartilage deprived of the phosphate of lime, by immersing it in an acid.

PLATE IX.

Fig. 1. Shews a large fungous exostosis of the thigh bone, arising from the cancelli, the surface of the bone, and connected with the internal surface of the periosteum, which passes over the swelling.

Fig. 2. Fungous exostosis from the cancelli, the bone partially absorbed by the pressure and growth of the fungus; *a*, the bone; *b*, the fungus.

Fig. 3. Shews a bone immensely expanded and partially absorbed, by the pressure of a disease of the medullary membrane and cancellated structure.

Fig. 4. A view of the tibia expanded, but forming a shell; over the tumor, as happened in the case of Elizabeth Hall. See Case, page 189.

Fig. 5. Periosteal exostosis of the cartilaginous kind; composed of bone and cartilage placed between the surface of the bone and periosteum.

Fig. 6. A section of *fig. 5*, immersed in a diluted muriatic acid, and the cartilage left which forms in these cases the nidus for bone.

These preparations are in the collection at St. Thomas's Hospital.

Fig. 1.



Fig. 2.



Fig. 3.

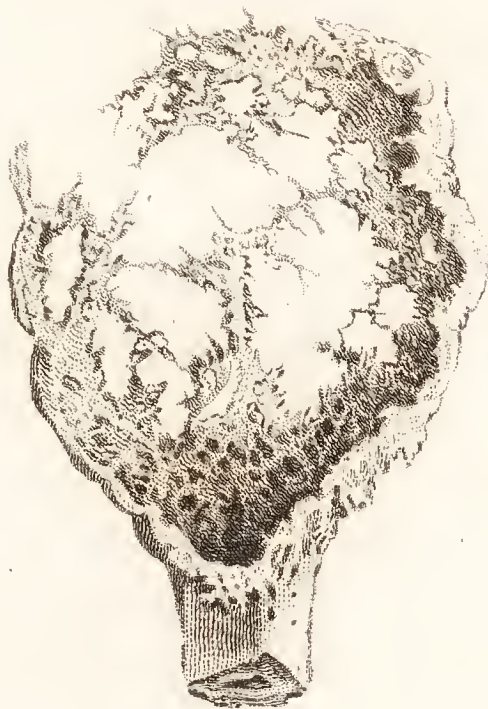


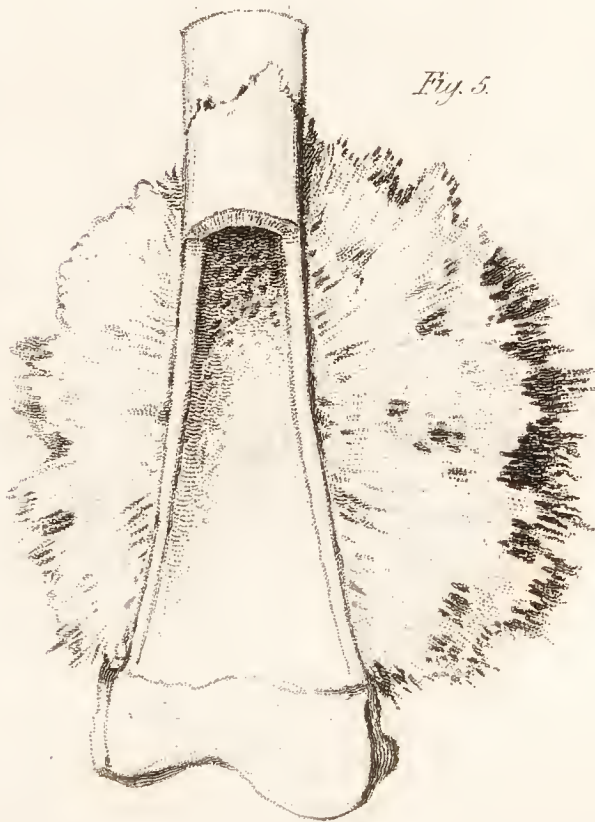
Fig. 6.

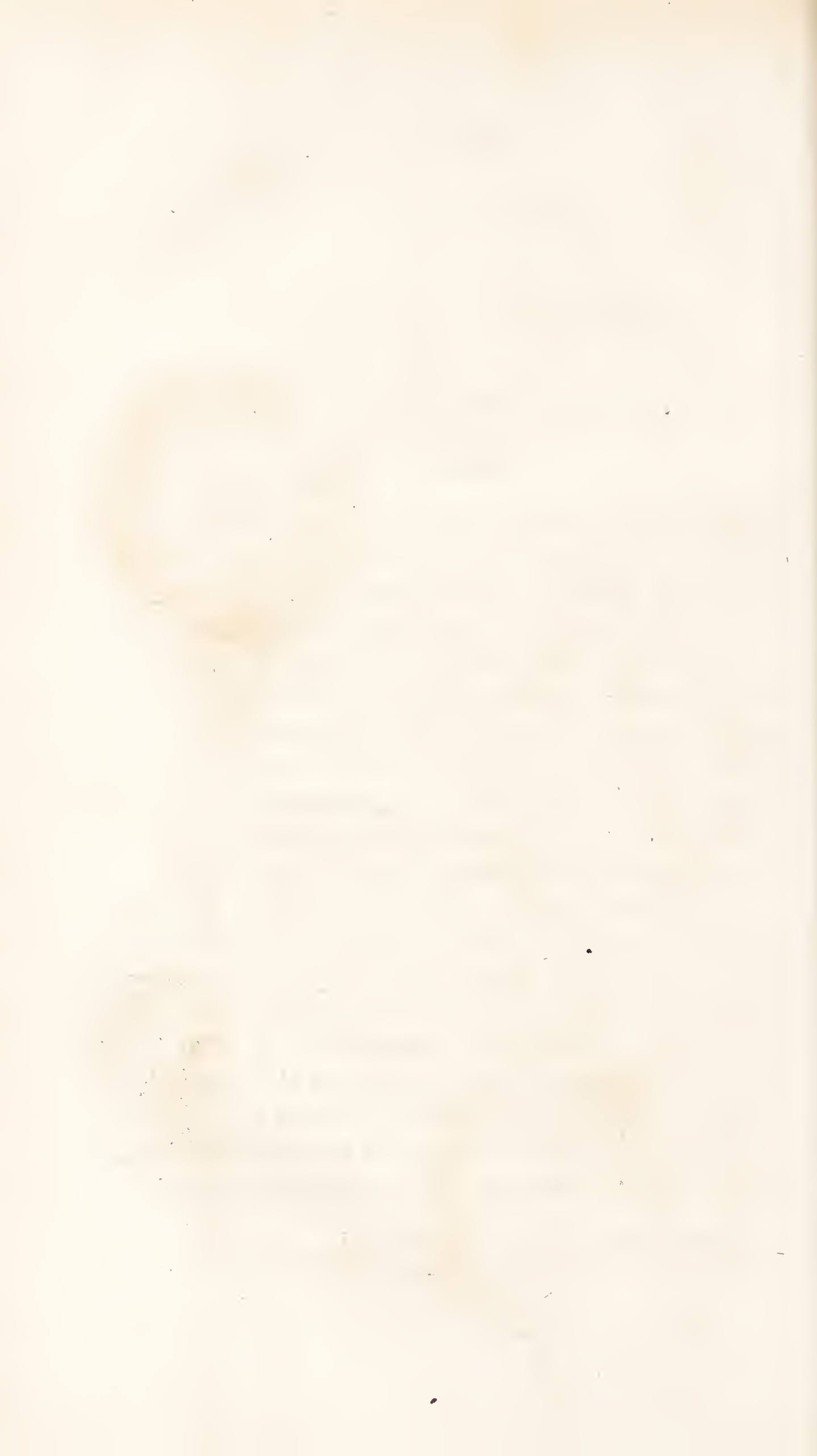


Fig. 4.



Fig. 5.





ON
WOUNDS
AND
LIGATURES OF VEINS.

By MR. TRAVERS.

THE inflammation to which the interior tunic of the veins is liable, was first distinctly pointed out by Mr. Hunter. The serious consequences arising from venesection had been supposed to proceed from other causes, previous to Mr. Hunter's Essay on this subject, in the Medical and Chirurgical Transactions. They were ascribed to a wound of the fibres of the cutaneous nerves, or the prick of the neighbouring tendons, or of the fascia upon which the veins lie, an opinion maintained by some writers even after the publication of Mr. Hunter's paper*. Inflammation of the cellular texture, the absorbents, or the fascia may occur from any wound penetrating those parts, and it therefore now and then appears after venesection, as Mr. Abernethy has shewn in his Essay on the occasional ill consequences of that operation †.

Inflammation of veins first described by Mr. Hunter.

Inflammation of other parts after v. s. described by Mr. Abernethy.

It may happen that the fibres of the cutaneous nerves may be wounded, as Mr. Abernethy has

Of nerves.

* B. Bell's Surgery, Vol. III. p. 122.

† Surgical and Physiological Essays. Lond. 1793. Part II.

also demonstrated; but the symptoms characterising an inflammation of the nerve, are very rare, as a consequence of venesection, and our observation of the effects of wounds of nerves, does not lead us to attribute any consequences to this accident, at all resembling those which have been in many instances shewn to arise from wounds of veins.

Inflamma-
tion after
tying and
dividing the
saphena, a
modern ob-
servation.

Similar serious consequences to those which have been observed after bleeding, have upon several late occasions, followed the operations of tying and dividing the vena saphena major, in cases of varix, and have created a general distrust of the safety of the practice; yet the ancients treated the veins with singular rudeness—pricking, cutting, tying, and burning them, without ever adverting to any other than the mechanical effects of such operations upon the diseases for which they were instituted*. And that this alarming and often fatal inflammation of the inner coat of veins, should so long have escaped the notice of the profession, appears most extraordinary, if we consider how much it was formerly the practice of surgeons to tie the veins after amputation. Many of the older operating surgeons in the country, army, and navy, still adopt the practice, and are unwilling to believe that it can ever be productive

* Hippocrates punctured varices. Ætius, Paulus, Avicenna and Albucasis describe the operation of excision. This seems to have been the practice of Fallopius and Severinus. Fabricius Aquapendens and Fabricius Hildanus inclosed the varicose vein between two ligatures, and emptied it by incision. Ambrose Paré, Petit, Dionis and others emptied it by punctures and brought its sides into contact by compression.

of mischief. I have frequently seen the femoral vein tied without any obvious ill effect; and one of the most experienced and successful operators in the West of England, lately assured me, that he had been in the constant practice of tying the main vein distinctly from the artery in amputations. Neither do the continental surgeons entertain any apprehension of a ligature upon a vein, nor are they, I believe, in any degree aware of the extensive inflammation to which the interior tunic of these vessels is in consequence exposed.

Having witnessed a few fatal cases, and heard of others, I felt impressed with the importance of the subject, and determined to investigate it by inquiry and experiment. I shall detail a few cases, that my readers may also feel its importance, and then offer the observations which I have collected from these sources, towards its illustration.

To my brother, Dr. Travers, of Newark, I am obliged for the annexed case, which occurred some years ago, under his personal observation.

CASE.

Ophthalmic depot, Military Hospital, Bognor, 1810.—Hugh Johnson, aged 33, constitution much impaired by hard service. Admitted 15th of May; was bled in the median basilic vein of the right arm, and a dossil of lint and fillet were afterwards applied in the usual manner; some purgative medicine was administered, and he was placed on low

Fatal case
of inflamed
vein from
V. S.

diet; on the 18th was convalescent, and discharged. 24th, re-admitted; the ophthalmia having returned with increased violence, was cupped on the temples; after the operation he complained to me of pain in the right arm, and said that the wound made in the vein on the 15th, had never closed; that soon after the bleeding, the bandage becoming loose, he applied some adhesive plaster; this had also soon rubbed off, and for some days the orifice made by the lancet had been unprotected. He had from the 16th felt pain, which now becoming severe, he was induced to mention it. Upon examination there was a small open wound, with everted edges, and a slight discharge of pus; the pain extended up the arm in the course of the vein, and he had a quick pulse. A poultice was applied to the part, a fomentation to the arm, and he was purged and placed on tea diet. 25th, more pain, vein appears enlarged, much redness and tension of the arm; wound as yesterday. A good deal of fever present. R Calomelanos, pulv. antimon. a a gr. iv. cons. rosæ, q. s. ut. f. bolus statim sumendus.—Admoveantur brachio hirudines xij.—Poultice and fomentation to be continued.—26th, was visited by the staff surgeon, arm less painful, tension and swelling greatly reduced; wound nearly closed; has had three copious alvine evacuations, and appears upon the whole better, though by no means free from fever. Poultice and fomentation ordered to be discontinued, and a spirituous lotion to be applied to the arm. Sumat mist. camphoræ, ʒj^m. ter. die.

27th, much the same as yesterday, wound is quite closed. 28th, arm free from pain, but the fever continues, and is now distinctly typhoid. After this day the constitutional symptoms rapidly increased, without any material change in the appearance of the arm. The usual remedies were administered, without any benefit, and on the 6th of June, the case terminated fatally.

Examination.

7th of June.—Puncture in the median basilic vein closed; no other appearance of injury inflicted by the lancet. The wounded vein appeared much enlarged, owing to an unusual thickening and adhering of the surrounding cellular substance. Internally pus was found occupying the mediana longa for about two inches below the origin of the median cephalic and basilic, and a similar appearance was traced through the whole course of the humeral vein to the axilla. There was besides an irregular deposit of lymph which adhered to the lining membrane of the vein. Before passing under the clavicle about an inch, the vein abruptly presented its natural appearance, and there was no sign of disease between that point and the heart. This organ was healthy, except a small circumscribed patch of lymph upon its anterior surface, and a similar deposition upon the opposed surface of the pericardium. A small quantity of fluid was found in the cavity of the latter, and in both sides of the chest.

About the same time a similar case occurred at Selsea, another station of the Ophthalmic depot, the particulars of which I am unable to

A second
fatal case.

communicate ; but this fact is strongly impressed upon my mind, that throughout it bore a very close resemblance to the one which I have related,

Mr. Broughton of Argyll-street, Surgeon to the St. George's and St. James's Dispensary, has related the particulars of a similar case with great clearness in Mr. Hodgson's work, on the Diseases of Arteries and Veins.

CASE.

Fatal case
of inflamed
vein from
v. s.

“ A robust soldier, 36 years of age, was bled in the arm for ophthalmia, which was considerably relieved by the operation. A degree of fever, however, came on, and gradually increased. On the seventeenth day after the bleeding his pulse was one hundred and twenty in a minute, and feeble ; his skin was hot ; his tongue covered with a brown fur ; his respiration difficult ; he complained of great prostration of strength, and pain in his head, back, and extremities. The wound in the vein had healed, but the day after the bleeding, great swelling and pain commenced in the arm, and gradually extended upwards. He was bled in the opposite arm, and various medicines were administered. The symptoms continued with very little alteration, until the twenty-third day, when a painful swelling was observed above the clavicle ; and in a few days afterwards, another soft diffused swelling was discovered underneath the angle of the lower jaw. The symptoms increased slowly ; respiration became more painful and difficult ;

the pulse was seldom less than 120 ; he became delirious, and died in the course of the seventh week after the bleeding.

The following appearances were observed upon dissection : the cephalic vein at the part where it had been punctured in the first instance, resembled an artery in the thickness of its coats, and in retaining a circular form when cut across ; below the punctured part it was healthy. About an inch above the puncture, its cavity was obliterated ; the obliteration extended to the shoulder ; the branches which communicated with the cephalic vein at the bend of the arm were healthy ; the absorbent glands above the clavicle were enlarged and hardened ; the internal jugular vein was much enlarged, thickened, and indurated ; the effects of inflammation were apparent throughout its whole course ; it had the external appearances of an artery, though larger than any artery, except the aorta ; the subclavian, axillary, and brachial veins, to the bend of the arm, exhibited similar appearances. The external jugular and subclavian veins were filled with pus ; when slit open, they were found to be much thickened and lined with lymph. Many of the smaller veins were in a similar condition. There was so much inflammation, adhesion, and induration in the upper part of the arm that it was extremely difficult to trace the vessels, and detach them from their connections ; the vena cava superior was healthy ; the diseased appearances were not gradually lost, but terminated abruptly ; the heart was healthy ; the lungs contained some small abscesses. A se-

rous fluid with flakes of lymph floating in it, was contained in the cavities of the thorax; the lungs adhered to the pleura costalis, partially on the left side, but more extensively on the right; the structure of the brain was natural, but more serum than is usual was found in the ventricles; the veins of the pia mater were turgid with blood; the vena magna Galeni, and the sinuses were remarkably loaded."

Persons labouring under inflammatory diseases are subject to inflammation of the wound after bleeding. Two examples of this fact have occurred since this paper was published. The one a case of acute inflammation of the chest which proved fatal; the other of inflamed intestine in a strangulated hernia.

CASE.

Henry Pennock, aged 22 years, was admitted into Guy's Hospital, on the 4th of March, for an ulcer of the leg. During the healing of the sore, he was attacked with symptoms of pneumonia; a vein was opened in each arm, and the wound bound up as usual. From an incautious use of the right arm, a hæmorrhage ensued on the third day after the venesection; he complained of pain in that arm, the orifice was inflamed, and the vein felt cord-like from the induration of the surrounding cellular membrane. Pressure in the course of the vein occasioned a discharge of pus at the orifice; a fomentation and poultice was applied, and the inflammation had nearly subsided, when an aggravation of the inflammatory disease of the chest proved rapidly fatal on the fifth day from the venesection.

Examination.

The orifice in the left arm was slightly inflamed. In the right arm, at the bend of the elbow, an abscess was found; and the orifice in the integuments was enlarged by the ulcerative process. The orifice in the vein was closed; its edges having a whitened appearance, as if lymph had been thrown out. The vein for about an inch below, and four inches above, was filled up by a coagulum, which, when removed, discovered the internal coat of the vein to have an inflammatory blush over its whole surface; but this blush did not extend higher than about four or five inches. The interior of the vein above was healthy.

The whole surface of the pleura was coated by a thick peel of recently deposited lymph. The lungs contained numerous vomicæ. There was a considerable effusion into the cavities of the chest; the heart and abdominal viscera were healthy.

CASE.

George Davidson, aged 27, sailor, was admitted on the 14th of April, into Saint Thomas's Hospital, for a strangulated inguinal hernia, requiring operation. This was performed with perfect success by Mr. Henry Cline. He had been bled to the amount of a pint from the right arm previously to his admission, and as a sufficient flow of blood could not be procured from the same orifice, a vein was opened in the left arm, and thirty ounces drawn from a free opening. In the evening he complained of pain in the latter

wound, which on the 16th had increased, attended by some hardness and a little inflammation around it. A poultice and some opening medicine were directed. On the 18th the inflammation had spread, and the arm began to be swollen, the vein above the orifice having a corded feel; the same plan of treatment was pursued.

April 20, evening.—There is now considerable constitutional irritation. His face is flushed. The pulse is 120, sharp and jerking. Tongue furred. Bowels but moderately moved. He complains only of the local uneasiness.

The arm is much swollen and inflamed from the hand to the axilla, very painful on slight pressure, or motion, especially in the axilla, and the situation of the lymphatic glands of the arm, and a small quantity of purulent matter oozes from the wound.

Ordered : VS. ad $\bar{\text{z}}$ xvj.—Hydrargyri submur. gr. v. statim—Sol. magnes. sulph. ter die sum. Fetus anthemidis.

21.—Spent a good night; is in every respect better, and now asleep; the pulse has lost its jerk, and is less frequent; the calomel has operated several times; he suffers less pain in the arm, and the swelling and inflammation are reduced; the blood drawn last evening is buffy, and moderately cupped.

Ordered : Hirudines xxiv.—Rep. hyd. submur. gr. v.

22.—The improvement is very marked; the swelling and inflammation have greatly subsided; pressure and motion give but little pain; he

rested well; has a clean moist tongue; open bowels, and makes no complaint.

24.—The improvement is in all respects confirmed.

There are few records of the disease which follows venesection, in which the state of the vein is noted, or its disease is suspected, in the works of the older surgeons. Hildanus reports the case of a woman whose arm was affected with gangrene after the formation of an abscess at the wound made in venesection; it spread from the wound to the fingers, and the amputation of the arm which became necessary, was performed with success. He refers the injury to the wound of the biceps tendon, and considers that the vitiated humors of the body were carried to the wound of the vein, which they gradually corroded and inflamed. The basilic vein was examined both in the stump and the part amputated; a fetid pus was copiously discharged from its extremities, so that to the former it was thought necessary, in order to correct the putrefaction, to apply the cautery*.

Abscess and gangrene of arm from inflamed vein after v. s.

I remember about the year 1801, when the operation of tying the saphena major vein was frequently practised for varicose ulcers of the legs, an elderly woman being the subject of this operation, which was performed in Guy's Hospital, a little above, and on the inner side of the knee. Inflammation of the vein followed, and several abscesses formed in the direction of the vessel, below the ligature, on the inner side of the calf of the leg. It was accompanied

Fatal cases of inflamed saphena vein from ligature.

* Fab. Hildani Cent. IV. Obs. 70.

From division.

with great constitutional disorder; some of the abscesses ulcerated, others advanced with great difficulty to the surface, and the patient died, worn out by excessive irritation. In a second case, that of a man who had drunk hard, two ligatures were made upon the vein, and the vessel was divided between them. In three days the man complained of pain in the course of the vein from the place of its division to the groin; an inflammatory blush appeared upon the leg, extending from the knee to the ankle, and on the succeeding day considerable swelling. The pain above the ligature extended to the bottom of the belly, and the thigh became swollen and tender upon pressure; the constitution sympathized with the local disease, and without the formation of abscesses, as in the former case, this man died, as it appeared, from extended inflammation of the vein.

Remarkable symptoms of constitutional irritation excited by the ligature.

Mr. Hodgson mentions two cases in which the division of the varicose vein terminated fatally*, the first on the morning of the fourth day, the second on the seventh or eighth. The same author relates a case from the practice of Mr. Freer, of Birmingham, in which the ligature of a varicose vein was followed by pain in the chest, hurried and laborious breathing, and a vomiting of blood four hours after the operation, which symptoms were immediately relieved by the removal of the ligature. The operation was followed by fever and vomiting, and retention of urine, when performed on another varicose vein of the same patient six weeks afterwards, although the ligature was removed.

* Diseases of Arteries and Veins, pp. 555, 558.

immediately after its application ; and again by similar symptoms of constitutional disorder, when repeated upon two other veins, after an interval of nine weeks, the ligatures being cut away immediately after their application. The fever went further on the latter occasion ; the patient was attacked with delirium and severe vomiting on the second day : the symptoms continued on the third and fourth day ; on the sixth she was slightly delirious, and her respiration much oppressed ; she was repeatedly blooded. “ In this case,” says Mr. H., “ the obliteration of the vein was the consequence of the application of a ligature which was immediately removed.”

In the 5th volume of the *Edinburgh Medical and Surgical Journal*, Mr. Oldknow, surgeon of Nottingham, communicates the following important narrative.

CASE.

“ A young man about 23 years of age, of plethoric habit, had been troubled for the last two or three years with painful ulcers about the inner ancle of the right leg, which repeatedly healed, and broke out again, so as to prevent, in a great measure, his attendance to business ; he therefore became desirous, on my representation, of having the saphena vein tied, it being varicose to within a hand’s-breadth of the knee. The operation was performed in the following manner. An incision three quarters of an inch long, and about one inch and a half above the distension, was made through the skin immediately over the vein, and in the direction

Fatal case
of tied sa-
phena.

of its course. The cellular substance was then carefully divided, the vein lying deeper than usual, until its upper surface was completely exposed. A probe armed with a double ligature was passed under the vein, taking care to include nothing with it, it being cleanly dissected from the surrounding cellular membrane upwards and downwards as far as the extent to the first incision and then tied. The portion of the vein between the two ligatures being afterwards cut out, the lips of the wound were brought together by a suture and adhesive plaster, with a view of healing it by the first intention. The patient was then put to bed, and directed to use a cold embrocation. On the second day he took some opening mixture. Third day, the wound was dressed, and appeared wholly united, except where the ligatures came out. The suture was cut out, and a fresh adhesive plaster applied. On this day he complained of pain in the lower part of the limb, that is, from the lowermost ligature, along the vein down the foot; to use his own expression, as if the blood in the vein were endeavouring to overcome the obstruction caused by the ligature. This sensation was however entirely removed by applying a bandage moderately tight from the toes upwards. Fifth day, there appeared a little erythematous blush about the wound. He had a trifling epistaxis, and I thought proper to take from him sixteen ounces of blood, which was not inflamed; the purging mixture was repeated. Sixth day, complained of a little pain on the inner side of the knee in the course of the vein; but there was no external inflam-

mation at that part. The lips of the wound began to separate. In the evening he was suddenly seized with a violent rigor, succeeded by a hot fit and symptoms of great vascular action, and some tendency to delirium. Pulse 130, hard and full, therefore sixteen ounces of blood were taken from the arm; it gave instantaneous relief, and was followed by the sweating stage, which continued several hours, and was succeeded by a state of quietude, soon however interrupted by a recurrence of the same train of violent symptoms, at first about once in twenty-four hours, but gradually increasing in frequency, and diminishing in strength, till nature became exhausted; death closing the scene twenty-two days from the operation.

For the first four or five days after the rigor, the wound discharged pretty freely, and by making strong pressure about the knee, a little matter was forced from it. The inflammation crept gradually up the vein, which was evident from its peculiar cord-like feel, and from giving pain on pressure, until it reached the groin, the inferior part getting well as the superior became bad, so that the wound was nearly healed before death, the ligatures having separated about the fourth day. There was no tumefaction of the cellular membrane, no enlargement of the glands in the groin, no superficial inflammation on the thigh. There was, it is true, a slight redness of the skin when the poultice was removed, (for the thigh along the course of the vein was covered with cold poultice) which entirely vanished on exposure to the air. The

medical treatment was strictly antiphlogistic; the patient was repeatedly bled, and with apparent relief every time, the blood being extremely sizzly ever after the first rigor. Two days, however, previous to his death, the vital principle was so exhausted as to need the use of cordials.

A second
case fatal.

This is the result of an operation which I believe is generally considered as a very trifling one, and not endangering the life of the patient; judge then my mortification at this unexpected termination. On inquiry, however, I find another fatal case has occurred in this neighbourhood, differing in its symptoms from the one I have related. Large collections of matter formed in the cellular membrane, along the course of the vein as far as the groin, and the patient died two months after the operation, the fever assuming the form of an intermittent."

A third.

My friend Dr. Stenson of Bourton, Gloucestershire, obliged me with the following letter in reply to an inquiry which I addressed to him respecting a case of varix, for which he performed the operation of tying the saphena vein.

"Most happy should I be to communicate any information you might wish relative to the fatal termination of the varix alluded to, but it is now more than twelve years since the operation was done, and at the time I made no notes and was not permitted to examine the parts after death, consequently can say little satisfactory upon the subject. It was then strongly recommended by a surgeon of the first eminence. All I can now recollect is this, that a woman of about 55, who had an obstinate ulcer of the leg, ap-

parently kept up by a diseased saphena major vein, had it taken up just as it passes on the inner side of the knee. In eight or nine days, violent inflammation took place in the course of the vein, accompanied by symptoms of great irritation throughout the system, so that you would have said, had you seen the disease, "this woman is dying of typhus."

I beg the reader's attention to the two following cases, which occurred lately under my own observation.

CASE.

John White, aged 28 years, was admitted into Guy's Hospital, Nov. 22, 1816, for an aneurismal tumor in his left ham. During the operation of tying the femoral artery in the thigh, with two ligatures, on Friday, Nov. 29th, 1816, a hæmorrhage took place from a small wound of the femoral vein. The bleeding was at first troublesome, but was presently commanded by a ligature which was applied around the opening, by nipping up its coats.

Fatal case of ligature on a wound of the femoral vein.

Dec. 6.—The patient has been doing well since the operation.

9.—Still doing well. In dressing, a small thread came away, supposed from the vein.

10.—There has been a slight hæmorrhage from the wound. He complains of tenderness on pressure between the crural arch and the wound in the direction of the femoral artery.

13.—Lower ligature came away (fifteenth day) the wound looking well, a considerable but healthy discharge. Swelling in the ham, and inner part of the thigh, less and softer.

14.—Complains of head-ache ; pulse quick and full ; bowels open, has not much thirst.

16.—Upper ligature came away yesterday ; (seventeenth day) discharge from the wound is less ; makes no complaint.

21.—The wound looks well, discharge much increased ; had last night a very severe rigor, followed by heat and profuse sweating. A slight rigor this morning ; bowels open ; appetite good ; has no pain.

24.—Patient is up for the first time ; feels himself very weak ; the wound discharges copiously ; granulations have arisen from the bottom of the wound ; the swelling in the ham and lower part of the thigh very much diminished ; complains of stiffness only in the part ; appetite good ; no return of rigor.

25.—Patient sat up two or three hours this morning, and felt himself better, but had a rigor at 8 A. M. Evening. Upon removing a poultice which was laid over the slips of plaster, he discovered that the wound had been bleeding. It was supposed he lost about twelve ounces of blood, but the character of the blood could not be ascertained, it being then coagulated. The wound was not disturbed, but an evaporating lotion was applied to the limb.

26.—A return of hæmorrhage ; had a severe rigor about eight o'clock this morning. Evening. Has had a slight bleeding.

27.—Had a rigor this morning about the same time as yesterday, followed by heat and profuse perspiration ; is very thirsty ; bowels open ; skin hot and dry ; pulse very quick.

28.—Has had a very bad night ; frequent and

severe rigors followed by slight heat, but considerable sweating. Had no return of bleeding, and the parts are kept cool by the wash. Bowels open ; he is very thirsty ; no appetite ; his pulse is remarkably quick. He has frequent rigors this morning, and can with difficulty keep himself warm.

29.—He is very weak ; pulse feeble ; had a slight bleeding ; no shivering.

30.—The shivering returned again last night ; the coldness has continued unremittingly, so that he cannot get warm. His pulse is quick and rapid ; there is a very material change in his countenance ; he has had no more bleeding, and the wash is continued ; he does not complain of the limb. The tumor in the lower part of the thigh and in the ham is much diminished, but the leg is œdematous and pits on pressure.

31.—The shivering continued during the greater part of the night ; his strength gradually failed, and he died at six o'clock, A. M. He complained yesterday of some difficulty in breathing, but not of any pain in the abdomen upon pressure with the hand.

Examination.

The limb, and especially the leg and foot, were œdematous ; the surface of the wound was in a sloughing state, but it was filled at the bottom by granulations ; the extremity of the divided artery presented a healthy appearance ; the femoral and profunda veins were filled by adhesive matter. When a blow pipe was introduced

into the upper extremity of the femoral vein, the air passed by it through the wound externally. The same was attempted to be done with the femoral artery, but it did not appear to have any communication with the external wound. The vein was next laid open; its internal tunic was covered with adhesive matter, and the sides at the lower part were adhering. It contained nothing like recent blood. All the coats were much thickened, and its capacity was gradually diminished downwards to the wound, where it was completely closed. There was an opening in the coats of the vein about three quarters of an inch above the obliterated part, and this opening communicated with the external wound. Below the obliteration, the wound was in a healthy state, the coats of the vessel were natural, and it contained a clot of blood. The adhesive inflammation had extended from the internal surface of the femoral vein to the iliac, as high as the bifurcation of the cava. The cava was also inflamed, but here the inflammation had not produced lymph or pus. The internal surface of the iliac vein presented the same appearance as the femoral; the corresponding iliac on the opposite side was not affected. The artery was next examined; its internal surface was healthy, the lymph plug extended to some considerable distance above the situation of the ligature, and its extremity was contracted and closed. There was considerable serous effusion in the chest, one of the lobes of the left lung was covered with a recent deposit of lymph, and the parenchymatous substance of the lungs

appeared to have been inflamed. There was also a slight inflammatory blush on the surface of the intestines; the other viscera of the abdomen appeared in a healthy state.

CASE.

John Crute, aged 30, suffered amputation of his right leg, above the knee, for a scrophulous disease of that joint of long continuance. His health was in no considerable degree affected. During the first two days succeeding the operation he appeared unusually low, often sighed deeply, and spoke but little. On the evening of the third day it became evident that he laboured under more constitutional irritation than is common after amputation, and he was attacked at night with severe bilious vomiting, his bowels being freely open. Early on the following morning, (fourth day) the dresser was called to him, and finding that he had passed a very restless night, and had a hard quick pulse, he drew 20 oz. of blood from his arm, and administered some aperient medicine. His pulse lowered and became softer, and he expressed himself relieved by the bleeding, but the vomiting continued at intervals. At noon the stump was opened; the lips of the wound, which were generally adhering, were separated, and a copious discharge of grumous blood, accompanied with purulent sanies, followed. A fomentation and poultice were applied to the stump: in the evening an exacerbation of the symptoms took place; slight rigors were followed by fever and delirium. On the morning of the 5th day his

Fatal case of inflamed femoral vein from ligature in amputation.

pulse was thready and very rapid, his countenance sunken, and he had incessant low muttering; he continued sinking until 3 p. m. on the following day, when he died*.

Examination.

The femoral artery in a healthy state; a firm plug of lymph obstructing the canal, which was contracted, as is usual where a ligature has been applied. On the mouth of the femoral vein was a ligature, which the dresser, in the absence of the surgeon, had applied, for the purpose of restraining an hæmorrhage after the ligature of the artery, apparently proceeding from the vein; he had done this without hesitation, having frequently seen it done with safety, by the surgeon under whom he formerly studied. From the site of the ligature, along the femoral external iliac and cava to the point at which the emulgents enter the latter vessel, the interior tunica was literally coated by large flakes of coagulable lymph†. There were marks of diffused inflammation extending to the right auricle of the heart, but the signs of adhesive inflammation terminated as described. The vein in the right arm, from which Crute had been blooded by a free opening, was examined. The integuments had closed over the wound, and the vessel was uninflamed. Between the

* As it was not my object in detailing these cases to refer to the treatment, I have purposely avoided mentioning it, that I might not uselessly divert the reader's attention from what conveys more information, the disease.

† See plate 10. fig. 1, 3, and 4.

mouths of the femoral vein and artery was discovered a small branch, arising immediately above the ligature of the artery; and this vessel was doubtless that from which the bleeding had proceeded.

CASE.

A middle aged man of a bad habit of body, induced by intemperance, was admitted into an Hospital for a very extensive sloughing ulcer of the leg. Amputation, as a last resource, was performed above the knee, and to the vein as well as the artery, a ligature was applied. On the fifth day from the operation he had a considerable degree of fever, which increased on the two following days. On the seventh he became delirious, and in a fit of delirium rose from his bed and stood by its side on the remaining leg. A state of low muttering succeeded, and on the ninth day he died *.

Fatal case of inflamed vein from ligature in amputation.

Examination.

The tied extremities of the artery and vein, with the surrounding parts of the stump, were found in a gangrenous condition, and for a space of some inches above the ligature the vein contained adhesive matter in a broken state, with which purulent matter was intermingled.

Mr. Hunter says, “ I have found in all violent inflammations of the cellular membrane,

Mr. Hunter's observations.

* I am indebted for these brief particulars of the case to a gentleman who witnessed it, and preserves the preparation.

whether spontaneous or in consequence of accident, as in compound fracture, or of surgical operation, as in the removal of an extremity, the coats of the larger veins *passing through the inflamed part, become also considerably inflamed*, and that their inner surfaces take on the adhesive, suppurative, and ulcerative inflammations; for in such inflammations I have found in many places of the veins, adhesion, in others matter, and in others ulceration.”—“ I have found them,” (these appearances) “ in the bodies of those who have died from amputations, compound fractures, and mortifications*.”

The origin of this inflammation after bleeding, Mr. H. attributes to the wound not healing by the first intention, and the imperfection of union being continued on to the cavity of the vein; for abscess between the skin and the vein is productive of no mischief, if the vein and parts below have united. The exposure of the cavities of the larger veins in accidents and operations, is often, he thinks, the cause of the very extensive inflammations which sometimes attend these cases. He states, that the abscess or the confinement of the matter in the wounded part of the vein, is occasioned by adhesions in the vein, a little above and below the orifice; and in the part where such adhesions do not take place, an abscess is formed, occupying a considerable length of the vein both ways; and often more than one, even a series of abscesses, generally in the direction of the vein between the orifice and the heart, but sometimes between the wound and the extreme parts.

* Medical and Chirurg. Transactions, Vol. I. p. 18 and 19.

He observed in some parts of veins thus affected, suppuration which had not yet arrived at ulceration, and in several other places ulceration had taken place so as to have destroyed the surface next the skin. He always found in cases where larger abscesses had come on than those formed simply from ulceration of the wound made by the lancet, that the vein was afterwards obliterated; a proof, he observes, that the sides of the vein can unite by the adhesive inflammation.

Mr. Hunter instances this disease in the horse after bleeding as frequently fatal, and seems to attribute it to the method of closing the external wound, when not executed with sufficient attention. He conjectures the fatal issue of the disease to be owing either to the extension of inflammation to the heart, or the passage of a considerable quantity of the matter secreted by the inflamed surface into the circulation.

I entertain no doubt of the facts stated on the writer's observation in this very valuable paper; but when Mr. Hunter says it is so common a case, that he has hardly ever seen an instance of suppuration in any part furnished with large veins, where these appearances are not evident after death, we are forced to conclude that he means to describe a sympathetic inflammation, *i. e.* one which does not arise out of violence done to the vein, but consentaneous with disease of the surrounding parts; and if so, there is surely too much latitude in the statement. The femoral vein in a psoas abscess, in abscess of the hip, and the subclavian and

Sympathetic inflammation of veins.

axillary in an abscess of the shoulder-joint, both of which had destroyed the bones, ligaments, and much of the surrounding muscular parts, shewed no signs of disease. The femoral vein of a man who died of a gangrene on the tenth day after amputation above the knee for an extensive fracture and laceration of the leg; of another who died of a mortified bubo, in whom the femoral vessels had been denuded for weeks preceding his death, presented no trace of inflammation. It is very probable, however, that the fact should escape observation, which was not particularly directed to it, as Mr. Hunter's was when this paper was written.

Morbid secretions of veins by contiguous sympathy.

A new and very interesting fact which gives much countenance to the opinion, that the cavities of veins are subject to inflame by sympathy with contiguous parts, is demonstrated by preparations in the collection of Mr. Langstaff, of Basinghall Street, a gentleman, who to the active duties of his profession unites an uncommon degree of zeal and industry in the pursuit of morbid anatomy. It appears that the veins in the vicinity of parts destroyed by the phagedena of the malignant fungus, and diseases of this class, are filled by a soft pulpy matter, resembling in texture the destructive growth*.

Inflammation by extension or continuity.

That inflammation may extend to these vessels from other inflamed parts, is shewn by a communication to the work above cited by Mr. Wilson, of Windmill Street, who describes a very interest-

* I lately found the internal jugular vein thus diseased, in examining, with my friend Mr. G. Young, the body of a man whose stomach and liver were affected with the medullary tumor. The lymphatic glandular system was diseased throughout.

ing case of inflammation, apparently originating in the uterine veins after recent delivery*. The inflammation extended to the iliac veins and their communications, and throughout the vena cava inferior, as far as to the entrance of the venæ cavæ hepaticæ. The coats of these veins were much thickened, and their canals plugged by coagula. From the emulgent veins downward, the cava was filled by lymph adhering to its sides. An abscess containing four ounces of well formed pus was discovered between the emulgent and hepatic veins. Immediately below the entrance of the latter, the tube of the cava was obliterated, partly by a puckering or contraction, and in part by a deposition of lymph. Mr. Wilson observed similar appearances of inflammation commencing in the veins of the uterus, and extending to the cava, in the bodies of two other women who died a few days after parturition; and Dr. Clarke mentions that he had found pus in the uterine veins in cases of puerperal inflammation†.

In the horse the disease, though common, is very rarely fatal. This point I ascertained by inquiry of persons who have very extensive opportunities of treating the diseases of these animals. And the insusceptibility of adhesive inflammation which belongs to the integument of the horse, is thought satisfactorily to explain its origin. My esteemed friend, Professor Coleman, of the Veterinary College, favoured me

Inflamed
jugular
veins of
horses.

* Med. and Chir. Trans. Vol. III. p. 65.

† Practical Essays on the Management of Pregnancy, pages 63, 72.

with the following note, in answer to my inquiry as to the correctness of Mr. Hunter's statement.

Mr. Coleman's observations.

“Inflammation of the vein after bleeding is much more frequent in horses than in the human subject; but Mr. Hunter was not correct in stating that an abscess is always formed at the wound. The most curious circumstance respecting this disease in horses Mr. Hunter has overlooked. In the human subject I believe the inflammation very generally, if not always, extends along the vein, following the course of the circulation. In horses I have never seen a case where the inflammation extended to the chest, or many, even one inch below the orifice; neither do I recollect any fatal case from this disease. The inflammation extends contrary to the course of circulation towards the head. The cavity of the vein is often filled with lymph; and when this takes place an abscess forms, and the vein above is lost. I have no doubt that inflammation of the wound sometimes takes place in consequence of the mode used to stop the bleeding; but I should observe that the most simple wound through the common integuments of horses is scarcely ever healed by the first intention; and it is this disposition to suppurate and to resist adhesive union, that is probably the most frequent cause of the external wound after bleeding not uniting by the first intention in horses, the same as in the human subject.”

Mr. Sewell's observations.

In a conversation with Mr. Sewell, Assistant Professor of the Veterinary College, he stated to me his opinion that the abscesses described by Hunter must be farcy abscesses, a disease

peculiar to the lymphatic system of the horse species, for the inflamed jugular vein seldom forms abscess, much less a string of abscesses. He has occasionally seen abscess form at the parotid gland after inflammation of the vein, and this event is considered critical of the inflammation, and therefore favourable. Sometimes a horse, by rubbing his neck after bleeding, or being soon after put to work with too small a collar, or from sudden exertion, as in coughing, opens the vein afresh, and brings on a dangerous bleeding, so that he requires to be watched night and day. In order to bleed a second time on the same day, some practitioners inconsiderately give the vein a blow above the vein to rupture the adhesion; and the vein thus burst open is apt to suppurate.

I was shewn at the Veterinary College the vein of a horse, which had been sent in for cure, the vessel having inflamed and ulcerated after bleeding at the place of the wound. The continuity of the vessel was destroyed by ulceration to the extent of an inch or more; its sides below the breach enormously thickened, and its cavity filled by masses of coagulable lymph above, so as to have lost all appearance of a tube. It was filled with a compact and extended clot of blood towards the heart. Upon dissection both lymph and pus were traced in the course of the vein into the sinuses of the brain, and the membranes of the brain were much inflamed. Where a vein is disposed to bleed afresh, owing to an ulceration of its coats, the most approved practice is to introduce the actual cautery superficially within its cavity, to produce eschar and the process of granulation.

Ulceration
of a vein
after bleed-
ing, and its
conse-
quences.

Obliteration of horses' veins after v. s.

Slough.

Ulceration of the wound.

History of a fatal case.

While prosecuting this inquiry, I met with cases in which the jugular vein had been obliterated by inflammation after bleeding, a case with which farriers are familiar; I was told of one in which a considerable portion of the vein had sloughed, the inflammation and abscess having extended in that case some way downward, toward the heart. I saw a third, in which the actual cautery was introduced near an inch within the vein, in consequence of repeated alarming bleedings from ulceration of the orifice; and at a slaughter-house I examined the vein of a horse which had died from hæmorrhage, in consequence of ulceration of the vein at the orifice. I obtained the following short history of this case. The farrier, dissatisfied with the bleeding from the first wound, again struck the vein with the phlegm, and made so large a wound that an hæmorrhage followed, which was with great difficulty suppressed. On the third day the animal was put to work, when the vein bled afresh to a very considerable amount. The cautery was then had recourse to, but the animal continued to bleed at intervals, and was soon exhausted. I have represented the ulcerated orifice of the vein in *fig. 2. plate 10*. Masses of coagulated blood were found in the vein above the wound, which was so extensive as nearly to dissever the vessel, but no appearance of an adhesive process presented itself in the upper portion of the vein. Next the heart the vein was lined by a rough coat of lymph, and at two inches distance from the orifice was obliterated by a contraction and interstitial thickening of its coats, so that it

presented a round solid cord of little more than the size of the artery, and of a cartilaginous hardness. The pericardium and pleura of this animal were inflamed, although the vein was sound between the point of obliteration and the chest.

Veins have been found obliterated and converted into ligament-like cords, in dissections of dead bodies, when no sign of a contiguous morbid action presented itself*; and not unfrequently their canals have been interrupted and their coats removed by the pressure of adjacent tumors obstructing the circulation†. It is of course impossible to ascertain whether inflammation had taken place upon the *interior* of the vein in these cases.

Obliteration of veins.

I have lately seen an instance of obliterated internal jugular vein, by the pressure of a tumor situated deeply on the right side of the trachea and covering the great vessels. The patient who was attended and examined after death by Mr. Kingdon, Surgeon, of Finsbury Place, had of late discharged pus and blood, both by the mouth and by the rectum.

Obliteration and ulceration of a vein communicating with an abscess.

The tumor was found upon dissection to contain dead cellular substance, and a quantity of blood in a state of putrefaction. The internal jugular vein was filled for some space by a coagulum of blood, but an ulcerated orifice of com-

* Haller, Opusc. Pathol. Obs. xx. Morgagni, Lett. 56. Art. 10; Bartolin. Obs. Anat. Cent. II. Hist. 35; Baillie, Med. and Chir. Trans. Vol. I. p. 127.

† Scarpa on Aneurism, by Wishart, p. 20. note; Lardner, Edin. Med. and Surg. Journ. Vol. VII. p. 407; Young in Hodgson, p. 533.

munication with the cyst of the tumor appeared above the coagulum, so that the blood returning from the head passed in part into the cyst ; there was also an ulcerated aperture of communication between the cyst and the œsophagus, and thus the contents of the tumor were from time to time passing into the alimentary canal. The artery and par vagum were sound, but the former was curiously defended by a covering of lymph.

From this case it would appear that an artery not only remains pervious under a degree of compression which causes the obliteration of a vein, but that the coats of the latter are destroyed by an irritation, which has only the effect of additionally supporting and strengthening those of an artery.

Artificial
pressure.

Veins in a state of varicose enlargement, have sometimes been obliterated by inflammation, the result of pressure artificially applied. I some years ago succeeded in obliterating a varicose cyst of the saphena, behind the inner condyle of the knee, in a labourer in the India Company's service, by means of adhesive plaster, applied in strips around the limb, with as much strictness as could be borne. The vein took on inflammation, and the cyst became a perfectly solid tumor, which afterwards shrunk, and was permanently obliterated. The inflammation was severely painful, accompanied by extreme tension of the part, and with considerable fever. By continued rest in the semi-flexed position of the limb, leeches and fomentations frequently applied, and an active

antiphlogistic treatment, the man was in a few weeks enabled, with the support of a roller, to resume his employment.

I have seen a case in which this change took place spontaneously, and was accompanied by like symptoms and consequences. The saphena, spermatic, and epigastric veins were affected, greatly distended and tortuous. Some years after the cure of the disease in the thigh, the spermatic vein underwent a spontaneous consolidation. It acquired excessive bulk, weight, and firmness, still retaining its natural tortuosity, so that it presented a very unique description of tumor. The epigastric varix remains. This is an inflammation induced by distension of the vessel I conceive, from arrest of the circulation. Mr. Hodgson is, I believe, the first who has publicly noticed this interesting fact. The reader will find two well marked cases of spontaneous obliteration by the extent of the coagulum, accompanied by symptoms of inflammation, in his valuable treatise.

Spontaneous obliteration.

“ Sometimes,” he observes, “ the coagulum accumulates to such an extent as completely to obliterate the canal of the dilated vessel. I have seen four cases in which this event terminated in the spontaneous cure of varices. In these instances it is probable that the coagulum accumulated till it completely filled the varix, or the upper portion of the vein communicating with it; the blood being unable to pass forwards, coagulated in the vessel to a considerable extent; this coagulum was gradually absorbed; as its absorption advanced, the coats of

Mr. Hodgson's observation.

the veins contracted; the vessel was ultimately obliterated, and the blood was conveyed through collateral channels*.”

It has been shewn—

Causes of
inflammation.

That the inflammation of the interior tunic of a vein sometimes follows a puncture, sometimes a division, a ligature encircling the tube, or including only a part of it; or arises spontaneously from an inflamed surface, of which the vein forms a part.

Causes of
obliteration.

That the obliteration of the canal is sometimes produced by the pressure of tumors, or by pressure artificially applied, or by distension from the extent of a coagulum of blood; and that the obliteration is occasionally met with in the dead subject, where the collateral circulation appears to have been long established, unaccompanied by any circumstances which explain the cause. I shall next inquire the essential points of distinction between this and the other order of blood-vessels, so far as regards their texture and properties.

Differences
in texture
and properties
of
arteries
and veins.

1. The external fibrous coat of veins is thinner and looser in texture than that of arteries; it is abundantly supplied with blood-vessels, and is so closely interwoven and condensed with the inner coat as to make them in a degree inseparable. Bichat, who particularly notices this fact, remarks, that it is a character distinguishing the venous from the arterial texture.† The middle and internal coats of arteries on

* On Diseases of Arteries and Veins, pp. 542. 544.

† Anatomie Generale par Xavier Bichat. Tom. II. p. 411.

the contrary preserve a distinct character, and though closely adhering, do not appear in any degree to intermix.

2. Veins have a slight appearance of fibres passing in the direction of their axes upon the larger trunks. Arteries have a denser and more distinct layer of fibres, passing in the contrary direction. Until of late these fibres have been regarded as muscular; but recent observations render the accuracy of this opinion doubtful.

3. The inner coat of veins which lines the auricles of the heart, and according to Bichat, the sinuses of the dura mater, although denser than that of arteries, is more flexible. It exhibits the terminations of the vasa vasorum more abundantly after fine injections than the inner membrane of arteries. It does not, however, in the natural state exhibit any appearance of blood-vessels, nor have absorbents or nerves been seen upon its surface.

4. The coats of veins, taken collectively, are remarkable for their tenuity, compared with those of arteries; hence their collapse when empty, which is improperly referred to inelasticity. They are also weaker*, but greatly more extensile, especially in the transverse direction; for they will bear a dilatation many times exceeding that of arteries, although they more frequently rupture†.

* This is now the generally received opinion in opposition to the inferences of Wintringham.

† Haller Elem. Physiol. Lib. II. p. 128, 9. Lib. VI. p. 351. Soemmering de corp. hum. fab. Tom. V. p. 327.

5. They are less elastic than arteries ; but the stagnation of the blood in varix, a disease originally depending upon a loss of this property ; their contraction upon a small quantity of blood, so as to empty themselves by a wound where the circulation is obstructed ; the opposite states of their canals under opposite extremes of temperature, and other phenomena, prove that they possess elasticity in no inconsiderable degree.

6. The trunks of veins are excited to contract by the application of concentrated acids and other chemical stimuli. Their contraction, thus excited, is said by Soemmering to be stronger than that of arteries*. They are not excited by mechanical stimuli, and are considered by Haller and others as devoid of the principle of irritability†.

7. Absorbents relatively to veins are of greater strength ; they resemble the latter in possessing elasticity, and in being furnished with valves.

I do not know that this comparative view, which might be much extended, especially if it were attempted to reconcile the discordant results of anatomical research, throws much light upon the inquiry in hand ; but it is to my purpose, as it shews some prominent features of distinction in the organization and properties of the different systems.

* *Loco citato*, p. 328.

† *Sec. Mem. sur les part. sensibles et irritables*, and *Elem. Phys. Lib. II. p. 126. and Lib. VI. p. 125.*

A difference not less marked will appear upon considering the relative pathology of these vessels, as might indeed naturally be expected.

Differences
in patho-
logy.

1. The coats of arteries are subject to ossific inflammation and deposition to an unlimited extent. Those of veins are very rarely the seat of this, and never, so far as I have observed, continuously, as we see in arteries.

2. In their disposition to inflame, as well as in other particulars, veins resemble absorbents; but the cases of inflamed vein bear no comparison in point of frequency to those of inflamed absorbents. It has been observed, that a wound of the same extent, and inflicted with the same instrument as that made in blood-letting, does not cause the extensive inflammation which we occasionally see it produce in veins, in any other texture of the body. This, however, if we consider the frequency of venesection and the rarity of these cases, can scarcely be admitted. The cellular membrane, the fascia, and especially the absorbents, inflame at least as frequently as the veins, and not less extensively from slight injuries, for example, from venesection, and from small wounds of the extremities.

3. The most material fact, however it may be explained, is this: the inner or lining membrane of veins is subject to diffused or continuous inflammation; that of arteries very rarely, if ever. I am aware that a preternatural redness of the interior surface is sometimes observed to run through the course of an artery.

4. The inner membranes of arteries and veins are susceptible of the adhesive inflammation. That of the former is defined, whether excited by pressure or by wound, or occurring spontaneously. I never saw the internal coat of an artery furred with lymph; and even where lymph is deposited in quantity sufficient to obstruct the current of blood, the deposit occupies a narrowly defined space, and the inflammation, by whatever cause excited, or however acute, is similarly circumscribed. In veins, on the contrary, the inflammation extends from the point of irritation towards the heart, or from branch to trunk. The lymph coats the vein like a fringe; and though the quantity effused is sometimes sufficient to obstruct the tube, the inflammation is often not bounded by the obstruction.

5. The inner coat of veins is susceptible of the suppurative inflammation, and the inflammation is often mixed, presenting both terminations alternately, *viz.* in lymph and pus. That of arteries is I believe incapable of suppuration, unless in a state of ulceration.

6. Veins are more disposed to ulcerative inflammation than arteries. I know not whether the interior tunics of either are capable of granulating, nor am I able to say whether there exists a difference in their power of resistance to gangrene.

7. The contrasted character of the inflammation of arteries and veins above-mentioned, explains the active constitutional sympathy pecu-

liar to the latter. This corresponds with our observation of the difference in this respect presented by the bounded and the undefined inflammation of joints, the peritoneal or the pleural cavities, and the other shut sacs of the body.

8. The constitutional symptoms excited by inflamed veins resemble in type those of diffused inflammations in other organs. They are similar to those of inflamed absorbents, which vessels also resemble the veins in their disposition to continuous inflammation.

Bichat has a remarkable passage on the disposition of the venous texture to inflammation, which I translate literally, as follows:—"The tissue of these vessels frequently inflames. Bell relates examples of its following external injuries. The inflammation of hemorrhoids is a circumstance commonly known. The cicatrization of wounds of veins after bleeding is a result of inflammation. The process of cicatrization in veins is doubtless assisted by the absence of the impulse, to which the arteries are subjected; but certainly the latter, under the same circumstances, would not heal so quickly, if at all. When an artery is tied, its walls brought into contact, inflamed, and often torn by the ligature, must adhere before the cure can be completed, and the ligature come away without danger. Now nothing is *slower and more difficult* of occurrence than their adhesion, on account of the *indisposition* of the arterial tissue to inflammation. To this may be attributed the hæmor-

Bichat's remarks on the disposition of veins to inflame.

rhages which so frequently follow the operation for aneurism, and others ; the bleeding often recurs, even after the expiration of twenty, thirty, or forty days. The surgeon ought to be very much on his guard after tying any of the larger trunks, on account of this great *indisposition of the arterial tissue to inflame*. Even when the artery is obliterated, it is frequently not by inflammation. Whilst the ligature arrests the blood, that portion of the artery that is comprehended between it and the collateral branches, *closes gradually, by means of the contractility of its tissue*, and forms a kind of ligament which obstructs the blood, after the thread comes away. I am not sure that these cases are not more numerous than those of inflammation. Now the veins *always adhere very soon after being tied, and their wounds cicatrise immediately*. It is almost always useless to tie them in large wounds, in the first instance, on account of the valves ; and afterwards, because *the cut ends contract, quickly inflame, and adhere*. A venous hæmorrhage takes place *immediately*, and not after so long an interval as in arteries. All this then proves that the vital energy is much more marked in the venous than in the arterial system, as regards their tonic powers. The want of cellular tissue in the latter, and its presence in the former, may have some influence upon this phenomenon*.”

Mr. Hodgson's opinions.

The most deservedly esteemed of modern

* Anat. gener. tom. II. p. 423. & seq.

writers on this subject, says, “ Inflammation frequently produces thickening of the coats of the veins, as well as adhesion of their sides and obliteration of their cavities ;” and again, “ A frequent cause of the obliteration of the cavity of a vein is the adhesion of its sides, in consequence of inflammation of its lining membrane.”—“ By placing the opposite sides of the cavity in contact, by means of compresses and bandages, the adhesion of the opposite sides of the dilated vessel is effected, and its cavity is consequently obliterated.”—“ When a vein is tied with a thin ligature, the internal surface of the vessel is lacerated, inflammation takes place, and, if the opposite sides of the tube be retained in contact by compression, their adhesion is speedily accomplished*.” I have transcribed these opinions, considering them to be those received by the profession, and shall refer to them, after stating the results of my own inquiry.

The healing of Wounds of Veins.

When a vein is wounded longitudinally or obliquely, there is no separation of the edges of the incision, so that only a little if any blood trickles from the aperture, unless pressure be made nearer to the heart, to obstruct the passage of the blood in the vessel. If therefore

Linear cicatrix if no blood escapes.

* Hodgson on Diseases of Arteries and Veins, pp. 519, 525, 547, and 555.

an animal be killed immediately after a wound of the vein, from which no blood has been drawn, the lips of the wound will be found in contact, and if permitted to live for a short time, the cicatrix will form a line.

Coagulum
in wound
after bleed-
ing.

If a vein is opened by a transverse section, it bleeds without the addition of pressure; and if the vein is half divided, the hæmorrhage is with much difficulty suppressed; the blood escaping into the cellular sheath of the vein and of the contiguous muscles in the direction of the current, and forming a distinct coagulum between the orifice and the external wound. The longitudinal or oblique wound, by which blood has issued in quantity, presents the same appearances; an oval naked coagulum forms the plug of the orifice, and a flattened covered clot, which is an extravasation into the cellular sheath, extends to some distance around it.

Twenty-
four hours.

At the end of twenty-four hours the lips of the wound are found separated, forming an oval proportioned to the length of the incision, the edges everted and adhering to those of the clot; the eversion seeming to be the effect of distension from the extravasation into the sheath: there is no blush upon the edges, nor any appearance of organisable or secreted lymph in

Three days.

the vein or the wound. At three days the same appearances are observed, but the internal margin of the wound is somewhat elevated and rounded, and a thin and narrow membranous expansion is perceived to be continuous with the everted edge of the internal

tunic. The clot itself is more compact ; and upon section presents concentric lamellæ, the interior being of a lighter colour than the exterior layers.

On the fifth day these appearances are more confirmed: the membraneous appearance extends over the surface of the clot, if the wound is not exceeding a quarter of an inch in length ; and in larger wounds the coagulum, which is reduced in size, has a membraneous surface.

Five days.

On the eighth day the new membrane is complete, the interior margin of the wound is raised and tumid, and the coagulum of a common bleeding wound is nearly absorbed. From

Eight days.

the twelfth to the sixteenth day, numerous vasa vasorum may be seen by the aid of a glass, passing from the internal tunic over the new-formed membrane and anastomosing upon it. At the latter period the edges are less raised, so as to be more upon a level with the new membrane, and have a slight red blush. The coagulum is entirely absorbed.

Sixteen days.

On the twentieth day it is only possible to distinguish the recent from former wounds, by the tenuity, smoothness, and transparency of the new membrane compared with the old, which is dense, tough, and wrinkled.

Twenty days.

This description applies to wounds of the size usually made in bleeding; the process is of course longer in completion, though not otherwise different in those which are more extensive. The coagulum, which forms the plug, is exactly proportioned to the size of the wound. The site and extent of the wound are ever after-

New mem-
brane forms
a pouch.

Is continu-
ous with
inner tunic.

Process of
healing in
arteries.

wards marked by the membrane which occupies it, which is thinner, more transparent, and more extensile than the proper paries of the vein. It forms, when the vein is filled, a pouch or bag; and the jugular veins of horses present many of these contiguous to each other*.—Farriers avoid bleeding in these pouches, because they find it difficult to staunch the blood. I at first supposed that this was a condensed cellular membrane, formed by the sheath of the vein; but I am satisfied that it is continuous with the everted edges of the internal tunic, and organized by its vessels. If it were consistent with what we know of reproduction, I should be disposed to conclude that the new membrane was formed out of the coagulum of blood, although I found that the coagulum could with care be detached from the membrane, which was continuous with the everted edge of the interior tunic. The new membrane is however evidently denser than the valves in structure, which are said to be prolongations or even duplicatures of the proper tunic.

Let us compare for a moment this account of the process of healing in veins with that which prevails in arteries, as related by that accurate observer, Jones. An artery bleeds, it is well known, upon receiving a wound, in whatever direction, by the impulse of the heart's action. From the difference of structure and circulation between the arteries and veins, a certain difference of course results as regards the approximation of

* See Plate 11. Fig. 6.

the edges, and the relation of the wounds of the vessels and their cellular coverings. “The longitudinal produces the slightest possible separation. The oblique occasions a separation proportioned to its extent : and the transverse, however small, seems to produce a circular aperture in the parietes of the artery.” By distension of the sheath of an artery with the blood which escapes from it on receiving a wound, the relative position of the wounds in the sheath and the vessel is altered, so that “a layer of blood is confined by the sheath over the wound in the artery, and by coagulating there, prevents any further effusion of blood.” But “its permanent suppression is effected by a process of reparation or of obliteration which takes place in the wounded artery.” An artery, “if wounded only to a moderate extent, is capable of reuniting and of healing so completely, that after a certain time the cicatrization cannot be discovered either on its internal or external surface ; and even oblique and transverse wounds, when they do not open the artery to a greater extent than one fourth of its circumference, are also filled up and healed by an effusion of coagulating lymph from their inflamed lips, so as to occasion but little or no obstruction to the canal of the artery.” “When the wound is very large, such a quantity of coagulating lymph is poured out, that the canal of the vessel at the wounded part is *more or less filled up by it.*”

A marked difference then may be observed in

the direct and indirect consequences of wounds, inflicted upon these distinct orders of blood-vessels.

The longitudinal wound of an artery, from which blood has just escaped in quantity, is found with “its edges in perfect contact.” A crescentic wound is in twenty-four hours united by an intervening portion of lymph, which “not only adheres to its edges, but seems to have been effused from them.”

In forty hours a transverse wound of one third of the cylinder is “distinctly seen plugged up with lymph, which adheres all round to its edges, and projects a little within the canal of the vessel.” In a more extensive transverse wound of the jugular vein, examined at seventy hours, I found no appearance whatever, but a plug of coagulated blood filling the wound, but not projecting within the canal of the vein.

At five days—“within the canal of the artery there was a very considerable and extensive effusion of lymph.” At eight days—“on each side of the wounded part, and to some extent above and below, there was a very considerable effusion of lymph which adhered to its edges.” At nine days—“the wound was seen to be completely cicatrized;” and the same abundant effusion of lymph was observed in the vicinity of arterial wounds, from which, owing to their extent and direction, the hæmorrhage had within a few days proved fatal *.

* Jones on Hemorrhage, chap. II. sec. 2.

The wound of a vein from which blood is not permitted to escape heals by what is called the first intention; the retarded healing and the formation of the membranous pouch are therefore incidental consequences of the separation by the clot, and by effusion into the sheath, of the edges of the wound. But neither mode of healing is attended by any such appearances as those described in wounds of arteries, nor indeed by any visible signs of inflammation, if we except the intumescence of the lips, within the vessel. I have never even observed a blush upon the edges of the wound until the membrane already formed was becoming vascular; much less any effusion of lymph in its vicinity.

Absence of the appearances of inflammation.

The effects of Ligatures upon Veins.

A ligature does not divide the internal tunic of a vein either in man or animals. It draws this tunic into longitudinal folds, and leaves a visible line of indentation which looks at first like discontinuity; but this impression is corrected by closer examination. It appears as if the outer or cellular coat only was divided. On examining the jugular vein of a horse at twenty-four hours, three days, and five days, I could see no difference in the appearances. The vein above and below is thrown into longitudinal folds on either side of the ligature. The portion next the heart is perfectly empty and collapsed; that next the

Appearances of ligature at twenty-four hours, three days, five days.

extremity is filled to distension by a long and generally firm coagulum of blood, which is a mould of the vessel, and bears the impression of its semilunar valves*. The coagulum extends for several inches; it is not always compact and lamellated, and adhering to the interior tunic, being sometimes less consistent, and broken; but it always fills the cylinder of the vein. There is no blush upon the inner tunic, much less any sign of adhesive inflammation, or thickening of the proper coats of the vein, or agglutination of the contiguous folds; these folds being effaced on the removal of the ligature; but the cellular sheath of the vein is thickened by a deposit of lymph in the vicinity of the ligature. The application of three ligatures half an inch asunder presents no difference*. The division of the vessel between two ligatures, allows of the retraction of the divided ends to the extent of an inch, but creates no diversity in the appearances described*. At seven days the effusion of lymph into the cellular sheath around the ligature is increased so as to encompass it, forming a sort of canal for the ligature distinct from the wound; and at nine days the ulceration of the coats of the vein has begun, which goes on progressively till its separation is accomplished*. This occupies a period of from fifteen to twenty-five days.—

Three ligatures.
Division between two.
Seven days.
Nine days.
Separation at twenty-five days.

In a young and healthy horse, the ligature was not liberated till the twenty-fifth day. The ulcerated ends of the vein formed a crescentic sweep, and were separated to the extent

* See Plate 12.

of an inch, and fastened by adhesion to the cellular sheath, which was much extended and thickened by a subjacent deposition of lymph, so as to form a smooth solid bed between the divided ends of the vein. The internal membrane of the superior portion of the vein had a thin ragged edge where it had been severed by ulceration. The lower edge was smooth and blended in with the bed of the wound. The extremities had undergone no contraction but that produced by the adhesion of the severed extremity to the sheath. The portion of the vein next the heart was empty. The upper was filled by a dark lamellated coagulum of blood, adhering very strictly to the internal tunic which was discoloured by it. On carefully separating the outer lamella which coated the interior of the vein, I could not discover any thickening of the proper coats of the vein, nor any appearance of inflammatory action within its canal, nor was any such appearance indicated in the lower portion of the vein*.

The effect of a ligature upon an artery is so well known, from the attention of late years directed to the subject, that it cannot be necessary to dwell upon it for the purpose of shewing the contrast which it offers to the process just described.

Ligature
upon an ar-
tery.

The internal tunic of an artery is divided by a round ligature, such as I employed in these experiments. The contraction of the tube at the place of the ligature is rendered permanent by a deposition of lymph between its coats.

* See Plate 13.

This inflammatory exudation in a few hours projects from within the fissure made by the ligature, and is increased until it forms a close bond of union between the opposed sides of the vessel. The ligature which is liberated in ten, fifteen, or twenty days, leaves the contracted ends at a small distance apart, adhering to the sheath, and of a conical form; the tube being at either end completely sealed up by a distinct coagulum of lymph tapering from the mouth; and a coagulum of blood is usually present within the vessel.

Only external changes similar.

The thickening of the sheath by an external deposition, and the condensation of the severed extremities within the sheath of the vessels, is the only point of resemblance in the processes: and this may be regarded as the effect of the foreign body, and wholly independent of the changes which the vessels undergo. Compression, which is only a broader ligature, would, I have reason to believe, produce no variation of the appearances, if applied to a vein. Upon an artery it is well known it has the effect of a ligature, operating only with more slowness.

Human bleeding veins.

These experiments, it is necessary to state, were made upon the jugular vein of the horse. The human bleeding veins are too small to exhibit so satisfactorily the process of healing. I have examined several after death, at early and remote periods, and find in those recently wounded a small coagulum in the wound, and more or less ecchymosis in the cellular substance opposite the wound, which in the case of thrombus is a considerable extravasation. The wound

has a distinctly oval figure, and while recent, the eversion of its edges is conspicuous; the cicatrix retains this figure, though in a less degree; it is more transparent than the rest of the cylinder, and may be detected, however ancient, by holding the open vein to the light. I have never seen the membrane of the cicatrix assume that pouch-like appearance which has been described in the veins of the horse. There is no unusual adhesion of the cellular substance and the vein, and consequently no stricter connection exists between the cicatrices of the integument and the vein than elsewhere. I have had no opportunity of examining the appearances produced upon a human vein, where it has been divided by the operation of the ligature.

From these accounts it appears that the internal coat of a vein, instead of being so strongly disposed to adhesive inflammation, as Bichat supposed, is on the contrary, when compared with that of an artery, difficultly susceptible of such inflammation. Indeed, the processes of healing and of division by ulceration, seem to be conducted without any manifest sign of inflammatory action on the interior tunic.

I confess, that although these results were unlike those which I had anticipated, the parallel which I have quoted from Bichat of the healing powers of arteries and veins, is so much at variance with our better information of the arterial pathology (thanks to our late industrious experimenter, Jones); and as regards the veins, is so palpably conjectural, that I did not feel much confidence in his exposition. The state-

Inferences
opposed to
those of
Bichat.

ment might be reversed with a nearer approach to truth. Arteries are quickly and strongly disposed to adhesion, and the hæmorrhages which follow the ligature, after a lapse of time, depend either upon a diseased state of the artery which prevents its inflammation and the secretion of lymph, or upon the destruction by ulceration or sloughing of an adhesion which had taken place. It is from the latter of these causes that the blood flows at the expiration of thirty or forty days; for if there be no adhesion, it flows much earlier. The contractility of tissue would be a very frail security could it be exerted in the degree supposed; but to expect that this could occur during the residence of the ligature, and to an extent sufficient for security, while the vessel is occupied by a coagulum of blood, indicates a very deficient information of the after changes, as well as of the direct effect of the ligature upon the artery.

The veins do not adhere after being tied; nor do their wounds under ordinary circumstances cicatrize immediately, nor do the cut ends contract and inflame. Further, venous hæmorrhages are peculiarly apt to recur, where the large vessels have been wounded; and this at intervals of many days from the wound*. How the cellular membrane in the venous tissue favours the doctrine which Bichat inculcates, he does not explain; but to me it appears that this fact, which he seems to have appreciated, has an obvious bearing upon the case when correctly stated.

* White's case, p. 241.

The indisposition of the venous membrane to inflame is not, as appears to me, inconsistent with its obvious tendency under adequate excitement to inordinate and excessive inflammation. It is not unusual to find the morbid actions of parts that are difficultly roused least controulable, when once set up. The mixed terminations of the inflammation of the venous membrane in the adhesive, suppurative and ulcerative states, and its disposition to spread by continuity, are characteristic of inflammation in the cellular membrane, as seen in the erysipelas and other affections, and are therefore probably to be referred to the predominance of this texture in its composition.

Indisposition not incompatible with excessive action.

Mixed terminations referred to texture.

It appears difficult to account for the origin of this inflammation; if we refer it to the operation of any peculiar and purely local cause, how are we to reconcile the infrequency of its occurrence, after an operation so constantly and so carelessly practised as that of blood-letting? not to speak of other operations and accidents by which these parts are wounded, lacerated, contused, compressed, ulcerated, &c. Besides we have seen that it occasionally follows various and dissimilar modes of local irritation. The apparent inadequacy of the local injury as a cause, the rapid and violent character of the inflammation, and the high constitutional disorder which is manifested, would on the other hand rather induce us to ascribe it to a peculiar state of the constitution*; and that subsequent venesections, performed upon these patients, have been unattended by similar local effects, can-

Origin, local or constitutional?

* See Cases, pages 232, 233.

not be admitted as an objection. Yet allowing the rarity of the case and the frequency of the operation, it will be found in nine instances out of ten to ensue upon a local injury, however simple. Exposure of the cavity of the vein is a circumstance often not accompanying the injuries by which the inflammation is induced, and continually occurring without any ill consequence. Non-adhesion and festering of the wound in the integument is an effect of suppuration beneath it, as frequently I should think as a cause. The subcutaneous abscess, as is observed by Mr. Hunter, is of no moment *if the vein and parts below have united*; in the human subject, abscess at the wound and diffused inflammation of the subcutaneous cellular texture, the lymphatics and their glands, and even the fascia, producing œdematous swelling and tension of the entire limb, are certainly more frequent than the inflammation of the vein as a consequence of venesection, where the wound has been improperly treated or neglected, and the patient suffered to use his arm without restriction. It appears from the experiments related that the wound of a vein after blood-letting does not take on direct adhesion, but that the last effused blood forms a plug or stopper to the wound; that the agglutination is complete between the clot and the edges of the orifice which it occupies, and that the clot serves as a bed for the production of the new membrane. If from any cause suppuration occurs, the clot will be loosened and displaced, and the action which commonly ensues where the adhesive is defeated

Exposure
of cavity.

Non-adhe-
sion of inte-
gumental
wound.

Deductions
from the
experi-
ments, to
explain in-
flammation
after v. s.

or disturbed, *viz.* the ulcerative, will be set up on the margin of the orifice. In most of the cases examined, the wound has been found enlarged by ulceration, and converted into one of a circular figure, as delineated in fig. 2, plate 10, or the tube has been deficient from the extent of ulceration at the part where the wound had been inflicted. The tendency of the wound to ulcerate after the application of a ligature, is shewn in White's case; and in all these cases the inflammatory action takes place, as Mr. Hunter, whom nothing escaped, likewise observed, between the wounded or tied part and the heart: the obliteration where that has been effected, or the attempt at it, is likewise found on the side of the heart *. The ulcerative inflammation upon the edges of the wound destroys the process by which the reparation is effected, and which by the eversion of the edges and the presence of the clot is rendered in a degree extraneous to the canal; and it is therefore a cause of irritation abundantly sufficient for the excitement of continuous inflammation, to which we see that this membrane is so remarkably disposed. Thus "the imperfection of union is continued on to the cavity of the vein," and if the presence of a thrombus in excess, the breaking of the agglutination and the necessary displacement of the clot by secondary bleedings, casual or designed, the immediate and unguarded exercise of the limb, the friction of the wound in the skin, or the application of adhe-

Obliteration generally next the heart.

* This was the case in the horse's vein, described at page 254. It constitutes an exception to the results of Professor Coleman's observation.

sive plasters, which fret and inflame it, are either or any of them adequate causes of the suppurative inflammation in the vicinity of the wound ; they are, I imagine, beginners of the mischief, though it may often be prevented from reaching the interior of the vein. I think, however, that the mode in which the wound is stopped and repaired, renders more intelligible the effect of these disturbances, and the manner in which from its exposed condition the vein is liable to be involved in the inflammation* ; in short that if the wound healed like that of an artery, it would not be subject to a secondary inflammation.

Sides of
veins do not
coalesce.

Although it is clear that veins undergo obliteration, I do not think it is by a union of the sides of the vein, as is the opinion of Mr. Hunter, Mr. Hodgson, and others, or as we observe to be the case in arteries under high inflammation. The tube, of little less than its ordinary size, is obstructed by masses of lymph ; or not at all reduced in its calibre, where obstruction simply has taken place, is filled by layers of coagula ; but there is no tendency to contraction of the canal, nor any disposition to adhesive union of the sides of the tube, and indeed the excessive secretion in the one case, and the massive coagulum in the other, are equally barriers to such a union. The disposition of the venous membrane to suppurative or at least mixed inflammation, affords a presumptive argument against its readiness to admit of adhe-

* The practice of bleeding repeatedly from the same orifice is not, in my opinion, a discreet though a very common one.

sive union. That the sides of the vein do not coalesce, is strikingly shewn by the mode of obliteration which is seen between the seat of inflammation and the heart, where an excessive furring of the inner membrane has taken place, and probably betwixt the heart and a wound or ligature *. That appearance stops abruptly, the membrane resumes its healthy character, and the tube is gradually contracted to obliteration by an interstitial deposition in the coats of the vein, by which it is rendered a round solid cord of a cartilaginous hardness, in its transverse section narrower considerably than that of the healthy vein. Although imperforate from compression, the canal is readily discovered by a section.

Obliteration by interstitial deposition.

Dr. Simpson, of St. Andrew's †, had occasion to tie the internal jugular vein in removing a tumor deep seated in the neck, with a part of which it was confounded. After eight days, seeing no appearance of separation, he cut the vein through immediately below the ligature, and found vein and all quite solid and of a cartila-

Example.

* The veins seem to fall within the compass of the following observation:—"Some surfaces of the body do not so readily unite by the coagulating lymph as others, and therefore, on such surfaces there is commonly a much larger quantity of this matter thrown out than probably would have been if union had readily taken place. Thus we see in inflammation of the heart, that the coagulating lymph is thrown out on the exterior surface in vast quantities, while at the same time the heart shall not adhere to the pericardium."

HUNTER *on the Blood and Inflammation*, p. 305.

† Edin. Med. Essays, Vol. V. p. 337.

ginous firmness. This I conceive was that interstitial thickening which contracts the tube to obliteration. It could not from its situation be a coagulum of blood. Whether the varicose vein, which becomes consolidated, undergoes the interstitial thickening just described, I cannot take upon myself to say; probably it is only an extended and compact coagulum; in either case I imagine that the vein is ultimately reduced by interstitial absorption to that ligament-like state, in which obliterated vessels have repeatedly been found in dissections. At all events, I think we are warranted in concluding, that the cure of varix when accomplished, as it often has been, by the operations of tying or dividing the vein, has not been effected by an inflammation of the lining membrane.

Successful operations do not inflame the lining membrane.

Two modes of termination.

It appears, upon referring to the histories of these cases, that they have two modes of progress and termination, *viz.* first, the formation of pus and sometimes of abscesses in the vein, which by ulceration of its sides communicate with the cellular membrane, and point externally in the course of the vessel: secondly, in continuous and pure adhesive inflammation, without any production of matter.

Mr. Hunter's case*, Mr. Oldknow's, p. 240, and that which I have mentioned as occurring in Guy's Hospital, p. 235, may be taken as examples of the first, where it forms abscess, an event simply depending on the interspaces

* Med. and Chir. Trans. Vol. I. p. 24. Mr. Hunter's indeed is an example of both; he found in some parts supuration only, in others, ulceration and abscess, p. 229.

left by the irregular deposition of adhesive matter, which here and there amounts to a quantity sufficient to obstruct the canal. But, although the formation of abscess is depending upon the circumstance which I have stated, the suppurative inflammation is mixed with the adhesive, as we have shewn, in numerous instances; to use Mr. Hunter's words, "*mixed as if formed with it*," the two modes of action "*going hand in hand*," another and insuperable impediment to union. The cases given by Dr. Travers, Mr. Broughton, and Mr. Oldknow, p. 237, are examples of suppuration in which the vein had not ulcerated so as to form an abscess. The cases of White and Crute are examples of the second termination. In these cases, the inflammation produces a continuous and excessive deposition of lymph, which extends to the trunks of the system, and sometimes reaches the heart. There is a marked difference in the symptoms accompanying these states: the first is a protracted irritation, producing hectic, and ending in exhaustion; the second is a typhoid fever, such as we often see accompanying the severer forms of local injury, and which speedily producing delirium, terminates within a few days. This is a difference, not, as I believe, characterising the mode or stage of the inflammation, but arising out of its situation, extent and communication with the surface or otherwise; where the vein of a limb suppurates and communicates with the surface, the constitutional disorder is of course less urgent than where it occupies uninterruptedly the vein

Corresponding difference of constitutional symptoms.

which adjoins, or forms the main trunk of the system. The former cases, although always dangerous, are occasionally recovered; the latter, I imagine, never.

Whence
the fatality
of these
cases.

There have been many conjectures respecting the cause of the fatal termination of these cases, at which I confess I feel surprised. Among others, the inflammations by extension, of the heart, or the membranes of the brain, and the conveyance of pus into the circulation have been mentioned. Not to insist on the innocuous quality of pus, it should be observed that the most rapidly destructive inflammation is that which has the true adhesive progress in which no pus is secreted. But if we consider the importance of the veins in the economy, the extent of surface which the collective *areae* of the venous tubes afford, larger, I imagine, than any of the shut sacs of the body, and the diffused and disorganizing character of the inflammation, we can surely be at no loss to account for the disturbance of the system. It is an error to suppose, that any quicker sympathy exists between the constitution and the venous, than the arterial or absorbent system. I say this, because I have observed something like that superstitious alarm, which is excited by events that we do not expect and cannot explain, has been produced by the fatal catalogue of tied veins, and a comparison of this with the generally successful cases of tied arteries. All the mystery of veins is, as I have attempted to shew, that they are indisposed to inflame, but when excited, inflame by continuity, and therefore it is that the

constitution sympathizes so deeply. The same would happen if arteries were subject to a similar law ; and it is fortunate for mankind that this is not the case. Tying or dividing the vein is not a cure for varix ; but if it were, the cure of a disease, which is little more than an inconvenience, would be too dearly bought at a risk of life. It is not so with aneurism.

It is my intention to prosecute this investigation, and I feel sincerely thankful for any communications connected with a subject of so much intricacy and importance.

Fig. 1.



Fig. 2.

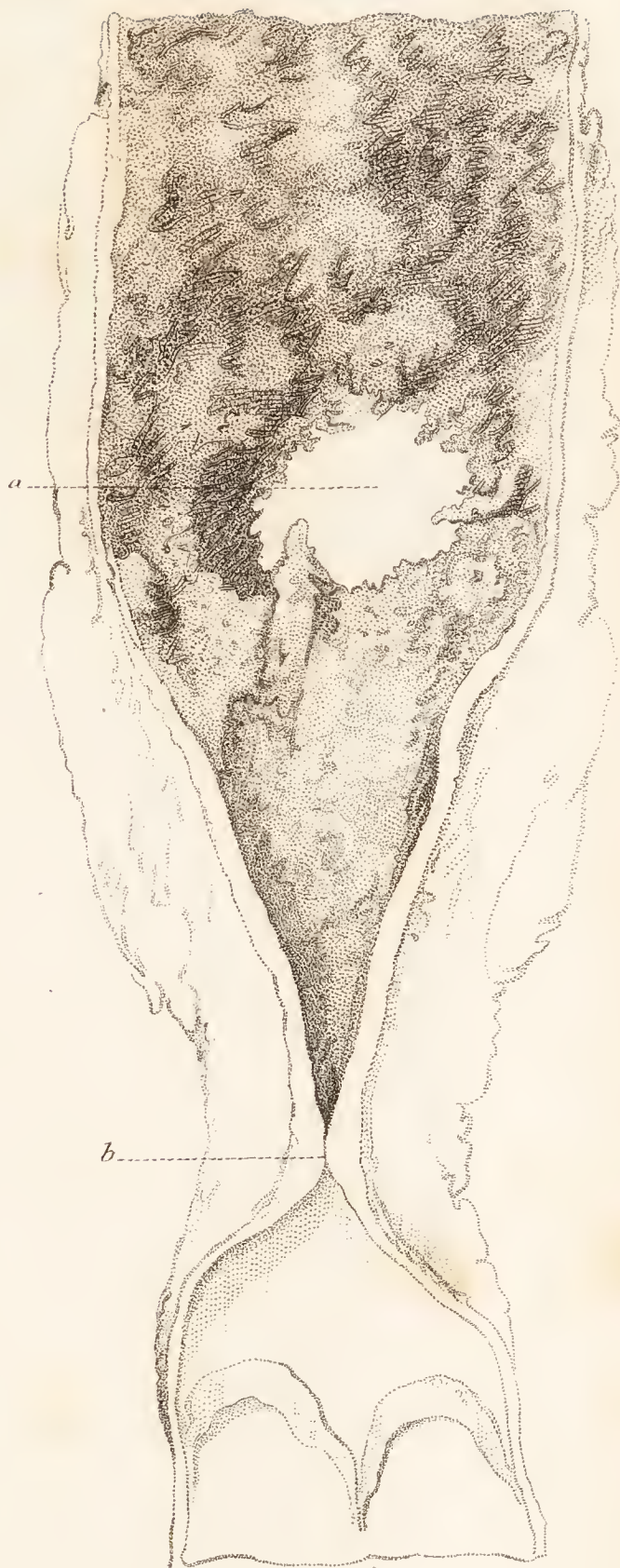


Fig. 3.



Fig. 4.

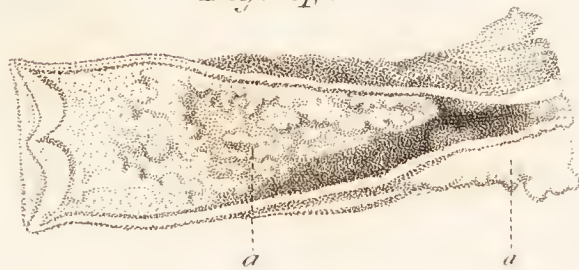


PLATE X.

Fig. 1. Represents the interior of the vena cava, in the case of Crute, described page 245; *a, a*, point to the flakes and fringes of lymph which occupy almost the entire surface of the inflamed tunic.

Fig. 2. Shews the appearance of the jugular vein of the horse, described page 254; *a*, the circular aperture formed by ulceration of the wound made in the phlebotomy. Its internal margin and the surrounding surface is coated with adhesive matter. *b*, the obliteration of the tube nearer to the heart by an interstitial deposition or thickening of the walls of the vein. A bristle only could be passed through this portion of the condensed vein, and upon a transverse section it presented an equal circumferential thickening of the parietes, with great induration. The interior of the vein below is perfectly healthy.

Fig. 3. The tied extremity of the femoral artery in the subject of *fig. 1*; *a*, the lymph plug, occupying the contracted portion which corresponds to the ligature.

Fig. 4. The tied extremity of the femoral vein of the same subject; *a, a*, a bed of lymph depo-

PLATE X.

sited exterior to the coats of the vein and nearly closing its extremity, where the ligature had been applied, and a fringe-like deposition covering and intimately adhering to the inner tunic, similar to that represented in *fig. 1.*

Fig. 1.



Fig. 6.

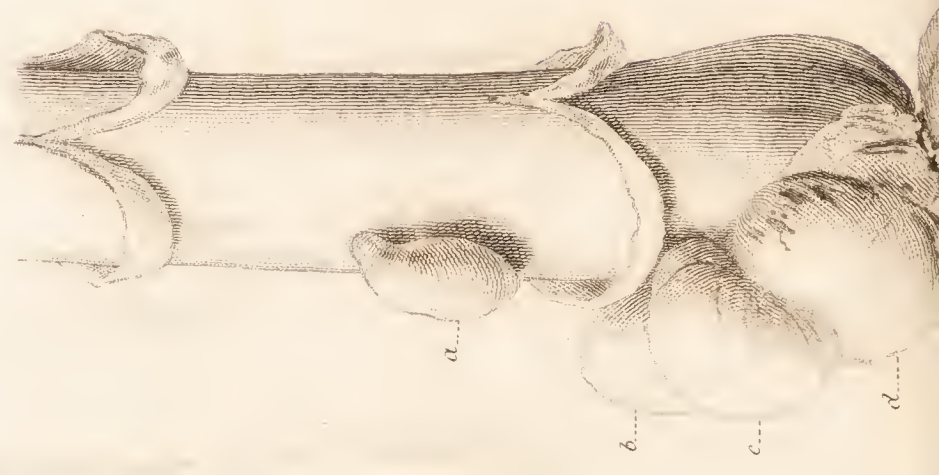


Fig. 2.

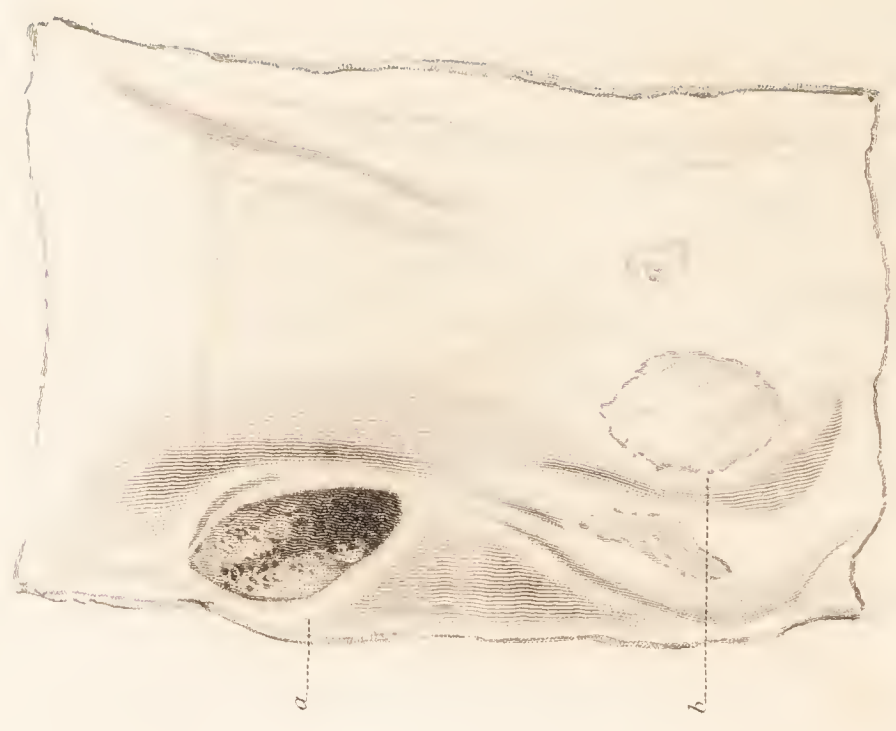


Fig. 3.

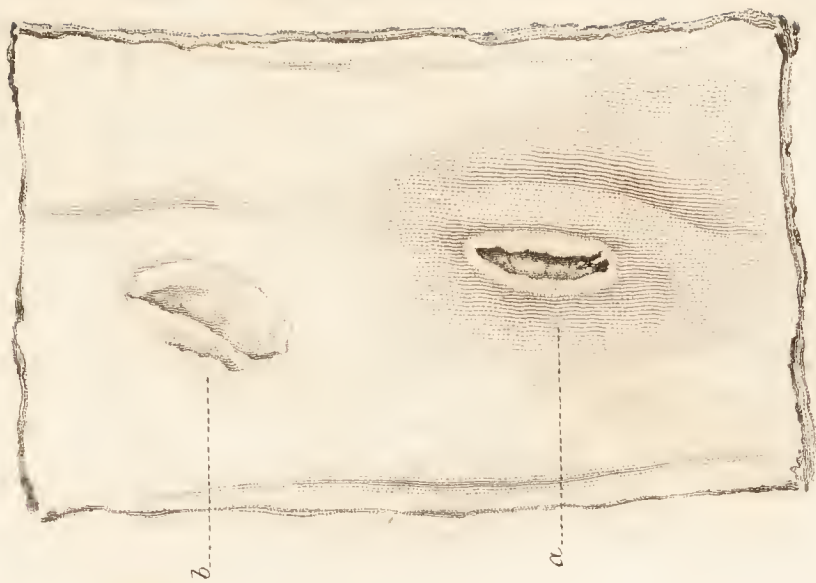


Fig. 4.

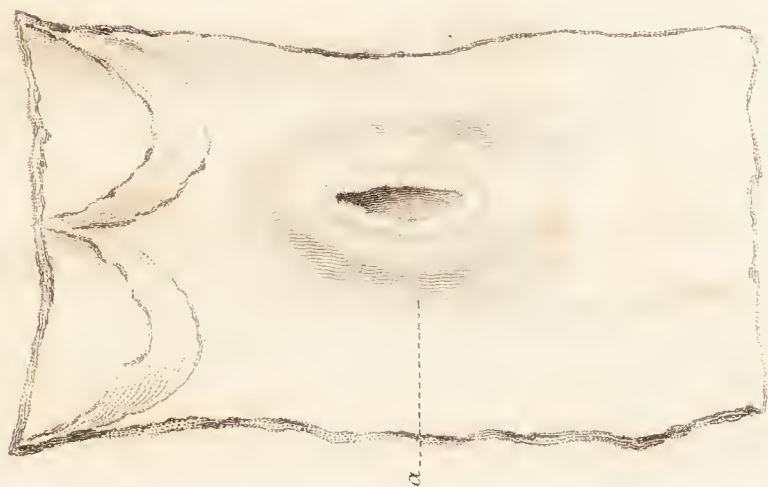
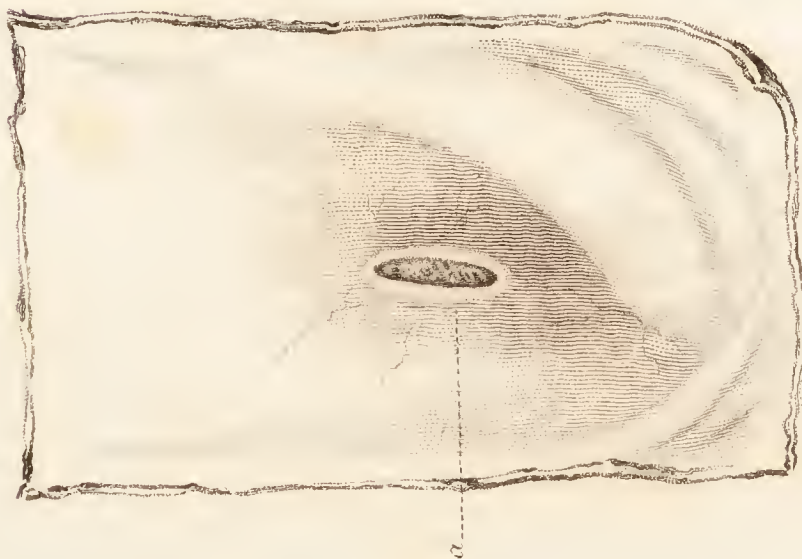


Fig. 5.



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PLATE XI.

Represents the healing of wounds in veins.

Fig. 1. The interior of the jugular vein of a horse, representing the appearance of a wound at the end of three days; *a*, the rounded sides of the wound, the cut edges being everted. The wound is filled by a compact clot of blood.

Fig. 2. Appearance of a wound at five days; *a*, the circumference of the wound, which is filled by an oval coagulum having an organizable or membranous surface; *b*, an old cicatrix formed of membrane adventitious to the vein; smaller cicatrices are seen in the vicinity.

Fig. 3. *a*, A wound of smaller dimension at six days; the new membrane completed; *b*, old cicatrix.

Fig. 4. *a*, A wound at eight days.

Fig. 5. *a*, A wound at fourteen days; the vessels upon the interior tunic were seen through a glass to anastomose upon the new membrane.

Fig. 6. The jugular vein of the horse inverted and filled with fluid; *a, b, c, d*, pouches of the new-formed membrane corresponding to as many wounds.

This drawing is from a preparation in Mr. Coleman's Museum at the Veterinary College.

PLATE XII.

Represents the effects of ligatures of veins.

Fig. 1. Ligature applied three days ; *a*, coagulum of blood filling the superior portion of the vein ; *b*, the lower portion thrown into longitudinal folds, empty and entirely uninflamed.

Fig. 2. *a, b, c*, The appearances occasioned by three ligatures applied for four days.

Fig. 3. The vein divided between two ligatures examined fifth day ; *a, b*, the lines of the ligatures ; *c*, a deposition of lymph in the cellular sheath of the vein.

Fig. 4. Ligature at seven days ; *a, b*, the ends of the ligature, which has been cut across, surrounded by adhesive matter external to the vein.

Fig. 5. Ligature removed at ten days ; *a, a, b, b*, the angles of the vein where it has been divided by ulceration ; the triangular space between the sheath and the vein was occupied by pus.

Fig. 7.



Fig. 2.

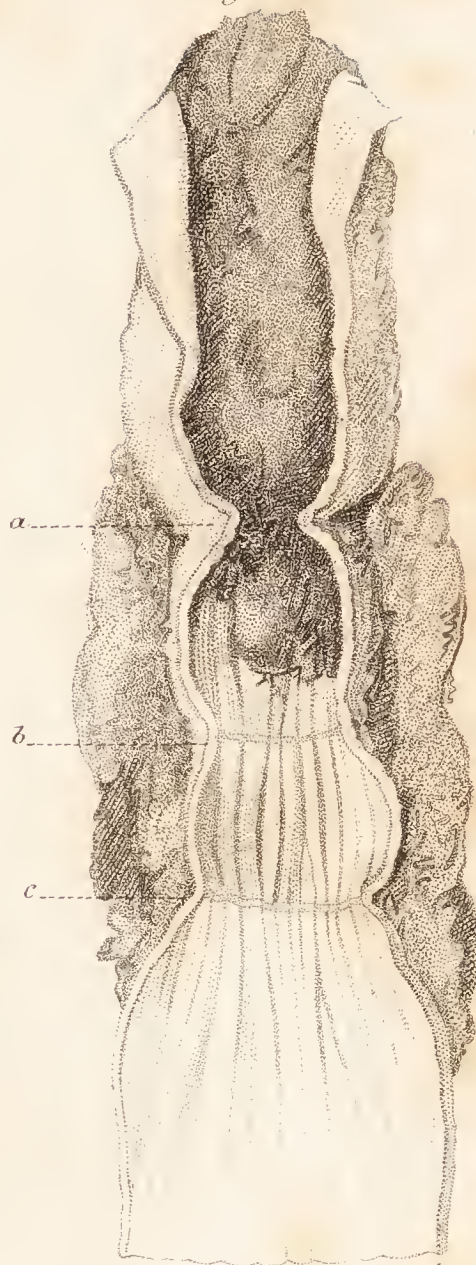


Fig. 3.



Fig. 4.

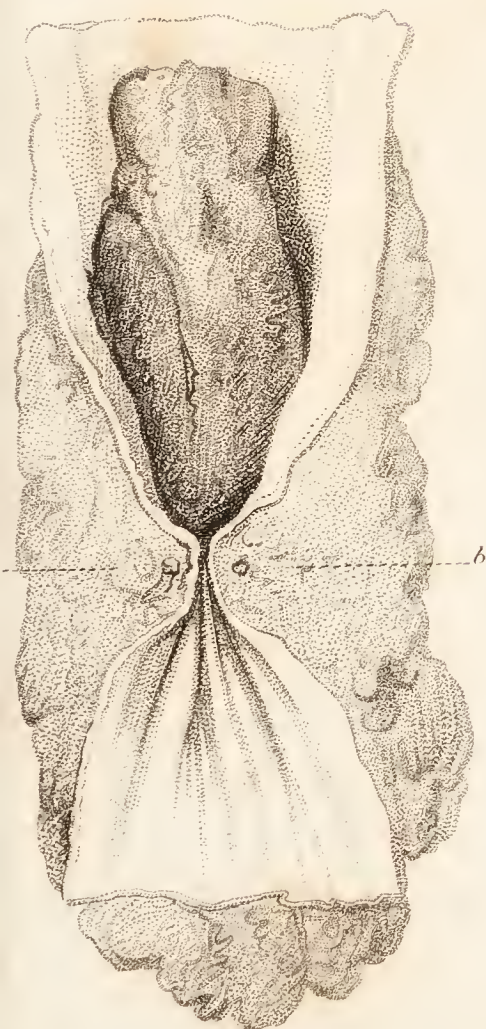


Fig. 5.

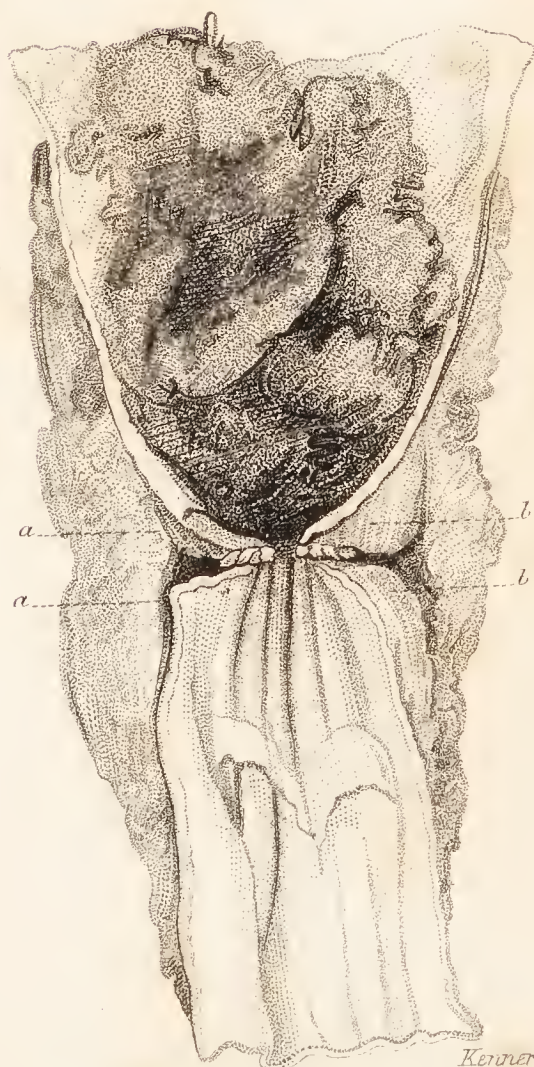


PLATE 13.



H. Thomson Del^t.

Kennerly Sculp^t.

PLATE XIII.

Represents the appearance of a vein divided by the ligature, which came away on the 25th day ; *a, a, a*, the thin ulcerated edge of the internal tunic of superior extremity ; *c, c, c*, that of the lower extremity smooth and condensed with the sheath ; *b*, the condensed cellular membrane corresponding to the bed of the wound.

The upper part of the vein is filled with firm layers of coagula which so tenaciously adhered to the inner membrane as to be separated with difficulty ; when separated, the surface was found to be perfectly smooth and natural.

THE END.



